American Machinist
Volume 59 NEW YORK, JULY 19, 1923 Number 3

Six Months in the Metal-Working Industries

Happenings in the Machinery Field Since January

By K. H. CONDIT
Editor, *American Machinist*

Last six months have seen returning prosperity—Reduction of unemployment followed by increased wages — Records fall in automobile, railroad, and iron and steel industries

UNTIL one takes the time to sit down and run through the news pages of such journals as the *American Machinist* it is hard for him to realize just how much can happen in one brief half year. When he does run through the news of the machinery industry carefully he begins to understand what a truly marvelous enterprise it is and how important has been its function in developing the material side, at least, of our modern civilization. Without the machinery which is responsible for present-day production, transportation and communication the whole intricate structure would soon fall and bring chaos to all but the most primitive and isolated human beings.

So much for the relative importance of the industry with which we are mostly concerned. What has transpired within it and affecting it since Jan. 1, 1923?

About the first events of importance were the national automobile shows. At New York many builders of machine tools, parts and equipment were represented in creditable exhibits. In connection with the show there was some talk that the automobile was so well established that there would be no need for future exhibitions with their attendant expense. It will probably be some time before such an institution as the automobile show has come to be, is allowed to die out. Further details of the automobile situation will be found in Mr. Reeves' review.

Exhibitions

The usual elaborate machinery exhibit in connection with the railroad mechanical convention at Atlantic City failed to materialize this year as the meeting was held in Chicago. The foundrymen had their usual big display which included many machine tools and other machine shop equipment. It was in Cleveland.

Plans for Philadelphia's Sesqui-Centennial to be held in 1926 began to take shape both from the industrial and engineering standpoints. There will be an international engineering congress during the celebration and the industrial exhibits will probably be the finest ever staged here or elsewhere.

A centennial of unusual interest to mechanical men took place in April when the Delaware & Hudson Company, as the first steam railroad to round out one hundred years of corporate existence, staged a dinner and special train excursion over its lines. Stress was laid on its part in developing the anthracite coal industry of the United States.

The Coal Situation

Which brings us to the coal situation, always important where machinery is concerned. The President's Fact Finding Commission under the chairmanship of John Hays Hammond has been working hard to get at the basic economic facts underlying our uneconomic coal situation. They have pointed out that there are quite a few too many bituminous coal mines and far too many coal miners. Engineering practice has been pronounced generally good but distribution methods are open to criticism. Their dictum to the hard coal miners and operators that the public will not stand for another coal strike seems to have had something of a sobering effect.

Another phase of the coal situation is the assigned car practice which the Interstate Commerce Commission has ordered stopped. In handing down the ruling one of the commissioners took occasion to hand the coal men several Irish bouquets. The Commission has lately been holding hearings on the railroad consolidations authorized by the Transport Act. Some hesitancy has been shown by strong, well-managed roads to take on the burdens of the weaker sisters. Physical

achievements of the railroads during the six months have been noteworthy. Car loadings have reached record figures one week only to be surpassed the following week. Details of the motive power and shop situations will be found in Mr. Colvin's review on another page. Railroad earnings have at last begun to approach the rates mentioned in the Transportation Act. As a result deferred maintenance of way and shop equipment may be remedied.

Records have also fallen in the iron and steel industry, producer of the raw material for the machine shop. The building boom which was checked on the verge of dangerous inflation was responsible to a large extent for the demand for steel although the railroads have also been rather heavy purchasers. The long-expected report of the Iron and Steel Institute's 12-hour day committee was a great disappointment in many quarters and has resulted in stirring the church investigators to renewed activity. In view of the report made by the 12-hour day committee of the Federated American Engineering Societies there is no cause to be surprised at the reaction of the churchmen to the Institute's report.

The wave of returning prosperity has practically eliminated the unemployment problem which was so serious a year ago. Detroit and the automobile factories felt the effects first and were the first to begin scouting for help. The shortage has become general since then and has been reflected in increased wages. About the only serious labor troubles seem to have been in the building trades.

The immigration question has naturally shown signs of returning animation as labor became scarce. Some people would have us let down the bars entirely and let "nature take its course." Others would put up more bars and keep out everybody. The golden mean has not been discovered and in the meantime the thing to do seems to be to treat the men you have so that they will stay with you and give them the best machinery and equipment available so that their efforts may be multiplied to the greatest possible extent, a good way to proceed at any time.

Another great help to economical production is standardization or, as some prefer to call it, simplification. Interest is growing steadily in this direction and engineering, government and industrial organizations are all doing their part to speed the good work. Screw threads, paper sizes and grades, preferred numbers and gears are among the many items receiving special attention at present.

No review of the machinery industry would be complete without mention of those who have made their mark on its tablets and gone beyond. A few of the many who have answered the last call are: John Armstrong, Armstrong Bros. Tool Co.; Clarence S. Bement, former president Bement-Miles Co.; Winslow Blanchard, Blanchard Machine Co.; James W. Carpenter, J. M. Carpenter Tap & Die Co.; Clyde M. Carr, Joseph T. Ryerson & Son, Inc.; F. C. Furlow, Otis Elevator Co.; W. H. Jennings, Murchey Machine & Tool Co.; A. B. Landis, A. B. Landis & Co.; C. K. Lassiter, Consolidated Machine Tool Corp.; Ernest Mills, Smith & Mills; Oscar E. Perrigo, Pratt & Whitney Co.; George A. Rentschler, Hooven, Owens & Rentschler Co.; W. T. Sears, Niles-Bement-Pond Co.; Henry S. Shaw, former president Boston & Maine R.R., Saco-Lowell Works and other companies; Charles Sheldon, Whitman & Barnes; C. T. Taylor, William Cramp & Sons Ship & Engine Building Co. and De La Vergne Machine Co.; M. C. Townley, Walcott Lathe Co.; Arnold Turner, Turner Machine Co.; Peter Weber, Sloan & Chace Mfg. Co., Ltd.; Dr. S. S. Wheeler, Crocker-Wheeler Co.; Frank E. Wing, L. S. Starrett Co.; Henry Woodland, Allis-Chalmers Mfg. Co.

Record Demand for Motor Transport

BY ALFRED REEVES
General Manager National Automobile Chamber of Commerce

Heavy closed car sales expected in Fall — Keen competition with low prices, improved highways and suburban growth creating increased use of cars and trucks

EXTRAORDINARY demands for individual transportation and for motor trucks, marked the first six months of 1923. The development of the first half of the year has been in the line of production, merchandising and administration rather than in technical features.

It is true that some cars are adopting four wheel brakes, novel gearshifts are being introduced, one line has added an air-cooled motor, permanent tops are in vogue, and experiments are being made with balloon tires. Each manufacturer, in short, is working on details which he believes will meet with public demand; but fundamentally the construction of cars has not been changed.

The outstanding fact of 1923 thus far has been the record production which amounted to two million vehicles in the first six months as compared with 1,161,000 in the same period last year.

Motor vehicle output is usually heaviest in the first part of the year so that the industry is looking for some seasonal recession, but the production this year will be well over the three million mark, which is far above the record of 2,659,000 cars and trucks manufactured in 1922.

There are several factors in the situation in 1923 which have contributed to the great increase in motor transport.

Motor vehicle values are the best in history. The reduced prices of 1921 have been generally adhered to despite rising material and labor cost. The makers

have counted on volume of business rather than profit per unit for their reward.

Merchandising has been better organized. Corporations are buying cars for their salesmen. Many concerns such as Armour & Co. find that the vehicles yield a profit in the added time efficiency of the salesman.

Rapid Growth in Highways

Highway building is going forward at the rate of 20,000 miles per year. This means an added usefulness and resultant demand for the motor car.

Highway intelligence is likewise on the increase. The public is getting a better understanding of how to handle traffic. Two states and thirty-eight cities reduced their traffic fatalities in 1922, and it is hoped that the record will be improved upon this year.

City planning commissions are working on the traffic problem in cities.

Aside from the remedy of wider thoroughfares, parking buildings, and one way streets, relief is looked for in the development of suburbs.

The counties of Long Island which lie outside of Greater New York have increased their motor car registration nearly four-fold and the number of trucks nearly fivefold in the past six years. There have been 60,000 homes built in that territory during this period.

It is apparent then that 1923 is proving itself a year not only of large usage of motor transport and of record manufacture, but it is also a time when the current issues of traffic are receiving attention.

Prospects

In view of a produtcion of 2,000,000 vehicles for the first six months, it is natural to expect a slowing down during the last six months. This slowing down usually comes in June and while there was some letting down during last month it was less than expected.

There should be a substantial buying of open cars during the summer but a slowing down in the fall.

The closed car continues in very heavy demand and there are many who look for the production within the next year or so to run sixty per cent closed as compared with the present thirty-seven per cent closed.

Competition is very keen among the various manufacturers. Prices are being held very low, with a view to maintaining as big a production as possible.

Railroad Manufacturing and Repair Shops Busy During the Past Six Months

By FRED H. COLVIN
Editor, *American Machinist*

Much new rolling stock put into service and many orders placed — Some new shop equipment purchased, but repair shops generally poorly equipped

A REVIEW of the railroad shop situation for the first six months of 1923 leads us to believe that it is safe to say that there is an awakened interest on the part of railway officials in improved shop methods and in the general betterment of the mechanical department. It is still true, however, that in too many cases the real railroad heads, those who control the purse strings, are more financiers than railroad men and do not appreciate the part which good shop equipment and standardized rolling stock play in economical railroading.

Advantages of Simplification

There are some roads which refuse to be carried away with the desire for newer types of locomotives every time an order is placed. They have selected a few well known types which have proved suitable to their needs and stick to them in spite of pressure from inventors and builders, with royalties to collect on patents of doubtful value. These same roads are eliminating older types as fast as possible, realizing that the fewer kinds of locomotives they have, the lower the repair costs and the less time is lost by keeping engines in the shop.

More shop equipment is being bought by many roads and there is a renewed interest on the part of railroad shopmen for better methods. This is the natural result of a more liberal allowance for new machinery, as no one can maintain very high enthusiasm in reducing costs when the management refuses to co-operate in the way of better and much needed machinery for the shop. There are instances, however, where machines which have done duty for from thirty to fifty years are still in service.

Much of this comes from the refusal of the higher officials to recognize the railroad as an active part of the problem of economical transportation. It is looked upon solely as an expense, and the part it can play in reducing transportation costs is seldom recognized. When officials will refuse to sanction the expenditure of three thousand dollars for a machine which is necessary to keep two million dollars worth of electric locomotives in operation, there is good evidence that a new brand of directors is sorely needed.

Money Not Actually Saved

Nor is the money which they refuse to appropriate really saved, even in the crudest sense. For in most cases it simply compels the railroad shop officials to build some sort of a makeshift machine to do the work, costing much more than the one asked for, and to disguise the expenditure under the head of shop maintenance. Nearly all of the home-made devices, with which railroad shops abound, are the result of refusal

to purchase proper machines for the work to be done. The cost is nearly always higher and the output lower than if standard machines had been purchased.

Then, too, the effect of this on the men is far from favorable for securing real production. Being brought up on makeshift devices and believing them to be the best for the purpose, they do not realize what standard machines could and should do and are content with less than the normal output. This is not so much from a desire to hold back, or delay production, as from a lack of knowledge as to what modern machine tools can really accomplish. Furthermore it leads to an inordinate amount of time being wasted in tinkering up some device to do the work which can be done better and cheaper on a standard machine. Why are railroad shops so full of home-made devices? First because of the necessity of getting something to do the work and later because of the ingrown idea that home-made devices might be better for the work to be done. There is an indefensible idea that railroad shop work is "different" from that done anywhere else.

The purchasing agent has also played a disastrous part in demoralizing the personnel of the railroad shop. Being all-powerful in many cases he could absolutely ignore the requests for certain machines for the work to be done, and substitute others simply on the basis of price, or because of other reasons which need not be mentioned. This alone has had much to do with the attitude of indifference which so many complain of in the railroad shop. For how can foremen be highly enthusiastic over their work when their judgment as to machines needed can be thwarted by a man who does not know a monkey wrench from a buzz saw? There is, fortunately, less of this than formerly, and this is one of the hopeful signs of real improvement in the railway situation.

Railroad shop executives appreciate many of the shortcomings of the present system and are keen for betterments of many kinds. Many of them refer to the Ford shop and envy the possibility of securing the best machines for the work from a purely efficient standpoint. They also realize that, while the Ford method of making repairs is costing more money than is usual at present, it will eventually show its economy. Given the opportunity to study machining methods in other shops, the most modern machines for the work, and the incentive which other industries offer, and the railroad shop man will hold his own with any machine shop executive doing a similar variety of work.

There has been considerable buying of new locomotives and cars during the first half of the year. Up to June 9 the locomotives numbered 1,684, freight cars 67,209 and passenger cars 1,300. Of these locomotives the great majority were the heavier types, Mikados, Decapods, Santa Fe's and Pacifics making up over 1,100 of the total.

The Car Service Division of the A. R. A. reports records of over 50,000 freight cars and over 1,200 locomotives being put into service since Jan. 1, 1923. This increase is encouraging but it also emphasizes the need for better and more efficient shop equipment to reduce the cost of maintenance, for a good many of the repair shops do not possess tools big enough to handle the parts on the heavy locomotives being put into service.

First Half of 1923 Sees Big Advance in Electric Power and Manufacturing Industries

By ROBERT M. DAVIS
Statistical Editor, *Electrical World*

Increased cost of equipment, fuel and labor has brought economies of generation to the front—Tendency toward larger turbo-generators—Big financial programs laid out

THAT the electric light and power industry is one of the fastest, if not the fastest growing industry in America today, will be denied by few authorities on industrial activities. And at no time in the forty years' history of the industry has its annual expansion been greater than that which is being witnessed during 1923. It is estimated that the electric light and power industry will spend $602,143,000 for additions and extensions during the present year, of which $283,813,000 represents the value of prime mover and generator equipment. In 1922 only $164,333,000 was spent in additions and extensions to generating plants and in 1920 only $95,666,000 was so spent.

The demands for more and more electrical energy at a comparatively low cost to the consumer despite the abnormally high cost of equipment, fuel and labor, has kept the problem of economic generation continually in the foreground. Greater efficiency in fuel consumption by improved stokerage and boiler construction has resulted in a saving to the industry during the last three years of almost eleven million tons of coal representing a value of over ninety-two million dollars. The advent of pulverized coal has stimulated strong competition on the part of multiple-retort and traveling-grate stokers, which are still the mainstay of all central stations. Considerable attention is being given to boiler furnace construction which will conserve heat and reduce maintenance. Excellent results are reported with high-temperature furnace installation in firebrick form which will withstand a pressure of 40 lb. per square inch at 1,900 deg. F. without shrinkage.

In the design of boilers the radiant heating surface is being increased where possible. Double-deck construction is being used in central stations not employing economizers. Where economizers are used the pressure type are being provided consisting of modified

boiler head sections having one pass and operating on the counter-flow principle with high gas velocity. Radiant-type superheaters and steel-tube cast-iron shell economizers have come into more prominence during the past year.

Elimination of causes of past turbine trouble, the development of record breaking sizes, provision for bleeder or mixed pressure operation and acceptance of orders for turbines operable at high steam pressures are the outstanding features of turbine development during the past year. The difficulties experienced with buckets and wheels due to axial vibration and the approximate coincidence of four-node and six-node critical speeds with the operating speeds have been carefully studied and have been overcome. Among other improvements which have been made are the provision of removable and replaceable low-pressure nozzles, improvement of nozzle partitions, provision of steam-sealed labyrinths with non-corrodible teeth, the use of cast-steel valve casings and turbine heads for temperatures of 450 deg. F. and greater, the elimination of vertical joints in high-pressure casings, and the redesign of emergency governors which permits testing them without disconnecting the generator from the line.

The most remarkable steam turbines for rating are the single-case units being constructed for the Brooklyn Edison Company, which are rated 62,500 kva. The 35,000-kw. base-load turbines which are being built for the American Gas and Electric Company to operate at 500 lb. pressure and 725 deg. F. are unapproached by any other turbines on order so far as pressure and temperature are concerned.

The Export Situation in Machinery

By W. H. RASTALL
Chief, Industrial Machinery Division, Bureau of Foreign and Domestic Commerce

American machinery exports seem to have reached a stable position—Comparison with exports of United Kingdom—Relative importance of various markets for our machinery

THE EXPERIENCE of the past half year indicates that our export trade in machinery has once more reached a basis that may be considered stable although there is still doubt as to whether it should be called normal or subnormal and in any case it is a very different basis from any we have ever considered normal heretofore. During the eleven months ending May 30, 1923, the exports of certain classes of industrial machinery were valued at $111,223,917 as compared with $111,062,261 for the corresponding period a year ago, but with $315,762,672 the year before that. During the war and the post armistice boom this trade was very large, but since early in 1920 it has been receding and although always fluctuating quite widely, and each type of machinery reacting a little differently from every other type, the trade appears to have reached its minimum at about $120,000,000 per year and may be expected to expand as conditions in certain foreign countries become stable and the general world situation improves.

The trend of this export business is shown more clearly by the returns of Table I, which exclude locomotives, electrical materials, typewriters, sewing machines, and all but strictly industrial machinery. Unfortunately it is not possible to develop an index number that can be applied to these returns.

In pre-war years Germany supplied about forty-five per cent of the machinery entering the international trade of the world. This was stopped during the war, resumed with the armistice, encouraged by the decline of the mark, restricted by other post-war conditions, but now it appears that Germany is no longer a really important factor in this trade. Apart from the small amounts of machinery exported from France, Switzerland, Italy, Holland, Sweden, and Japan, the machinery trade of the world is divided between British and American producers and it is to be expected that the latter will be able to take over a fair proportion of the business formerly secured by German manufacturers provided it is given adequate attention.

Also one would expect that up to this time American participation in this international machinery trade would decrease and British participation increase for at the time of the armistice British producers were more or less out of the market while American manufacturers were enjoying an exceptional trade. The experience of the markets of Japan and China shows what has actually happened and as is indicated by Table II

TABLE I—YEARLY EXPORTS OF MACHINERY

U. S. EXPORTS OF INDUSTRIAL MACHINERY

Fiscal Year	
1910	$ 49,117,620
1913	88,058,604
1915	73,264,575
Calendar Year	
1919	284,678,786
1920	324,252,357
1921	208,798,201
1922	112,288,922

TABLE II—EXPORTS OF MACHINERY TO CHINA AND JAPAN

	Percentage of Machinery Imports into China		Percentage of Machinery Imports into Japan	
Year	From U. S.	From United Kingdom	From U. S.	From United Kingdom
1910	....	....	11.1	81.4
1911	5.8	35.5	13.6	72.1
1912	3.8	37.5	13.4	63.3
1913	9.4	45.4	9.4	66.4
1914	8.3	46.0	15.3	59.6
1915	14.7	44.5	28.0	59.1
1916	17.6	38.4	46.0	45.1
1917	23.6	27.6	52.3	39.8
1918	30.4	16.7	78.5	17.5
1919	45.0	14.4	74.0	18.6
1920	54.1	23.2	64.0	31.5
1921	38.6	38.8	47.9	41.4

it would appear that the time has come for American interests to give careful study to the causes reflected by these returns, and possibly arrange to cultivate these and other markets much more earnestly.

It is, of course, recognized that there are great differences between the machinery supplied from these different sources and that price, design, and a number of other factors enter into the problem; also it should be noted that while the average American manufacturer exports say twenty per cent of his product, the British producer looks to foreign markets for about sixty per cent of his business, so must be more deeply interested in this trade. But notwithstanding all this the fact remains that it is perfectly possible for American producers to secure a very satisfactory volume of business in foreign markets and the indications are that these markets deserve much more consideration than they now receive. It might also be added that, properly handled, this foreign business should be the most attractive that comes into the shop.

Among the foreign markets conditions are showing signs of a change. Until recently the markets of Europe have been contracting while those of Latin America and Asia have been taking an increasing proportion of our machinery exports. Table III is presented to illustrate this situation. Although the markets of Europe show signs of absorbing regularly about $20,000,000 worth of American machinery, it would still appear to be good policy to give closest attention to the non-European markets.

TABLE III—RELATIVE IMPORTANCE OF MACHINERY MARKETS

EXPORTS OF MACHINERY FROM THE UNITED STATES

	Europe		Latin America		Asia	
1910	$14,148,759	28.8%	$13,483,948	27.5%	$3,666,244	7.4%
1913	28,118,549	32.0%	19,085,692	21.7%	4,610,045	5.2%
1915	38,218,925	53.6%	11,059,820	15.1%	3,777,440	5.2%
1919	100,396,893	35.2%	54,561,206	19.2%	61,879,671	21.7%
1920	90,730,853	28.0%	88,258,643	27.2%	65,308,252	20.1%
1921	41,100,145	19.7%	70,334,654	33.7%	55,598,449	26.6%
1922	23,236,149	20.7%	28,020,356	24.9%	31,036,614	27.6%

Although it might be possible to go further and point out that during the past year gratifying increases have been noted in the export of mining machinery, construction machinery, metal working machinery, etc., it is necessary to remember that business of this character may be expected to fluctuate widely and it is scarcely wise to emphasize too much the returns for isolated periods. On the average, American machinery manufacturers export nearly twenty per cent of their production (some export sixty per cent) and this is the real basis to be used in estimating the probable value of export trade.

Price Curves of Machine Shop Supplies Show Tendency to Flatten Out

BY ALDEN W. WELCH
Manager Business News Department, McGraw-Hill Co., Inc.

Prices of materials average thirty per cent higher than year ago—Metals market weaker—Not much change in other supplies recently

IN KEEPING with costs in general the prices of machine shop materials and supplies rose to high levels during the last year and now for several months have remained fairly stationary. Three months ago prices of non-ferrous metals began to descend toward a dull and weakened market condition, which has been reached. The reason was lessening demand. Steel, on the other hand, remained firm during this period.

The present high production of iron and steel is chiefly to fill orders already on the books. New business is small. The price of pig iron has been falling since early May; but the steel base has been maintained for the last two months, although the premium charged for immediate delivery has disappeared.

Supplies such as lard cutting oil and abrasives have taken rather sharp upward turns of late, owing to increased demand brought on by higher production schedules.

Steel.—Soft steel bars have advanced steadily since April, 1922, at which time they were $2.25 per 100 lb. at Cleveland warehouse, taking this point as being fairly representative of the general market trend. Cold finished shafting and screw stock have followed practically the same trend as steel bars. Quoted at $3.15 per 100 lb. at Chicago warehouse in April, 1922, the price advanced to $4.30, which quotation has prevailed during the last two months. The price tendency on both bars and shafting is easier and present market indications point to a slowing down in production and consequent lowering of prices.

Brass Rods.—The present price at Cleveland warehouse is 21c. per lb., in 1,000-lb quantities. This quotation has remained in effect since March of the current year and represents an advance of 5c. per lb. over the price prevailing one year ago and is ½c. per lb. under the market as of August, 1922.

Drawn and rolled brass products are experiencing a rather quiet market at the present time; curtailment in zinc mining operations having already begun in certain districts. Unusual changes in the copper market are improbable, so far as the immediate future is concerned, owing to the extensive capacities of low-cost producers.

Solder.—In keeping with the other non-ferrous metals, solder reached the peak for the current year in April and declined during the following month to its present level. The current price is 30½c. per lb. at Cleveland warehouse as compared with 22c. in July, 1922.

Drastic price declines have induced considerable purchasing of non-ferrous metals, particularly tin. Present cost levels, however, have remained fairly stable for the last two months.

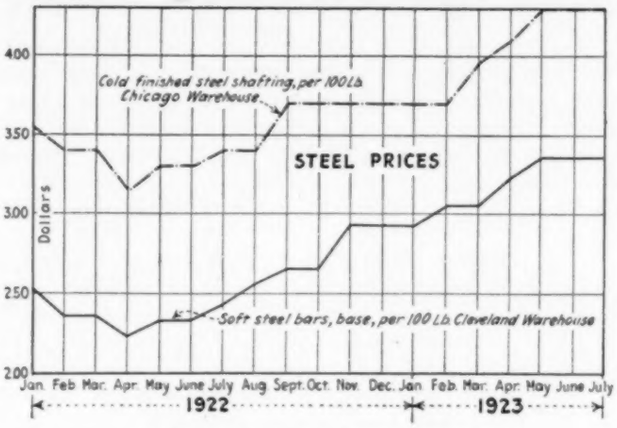


FIG. 1—TREND OF STEEL PRICES

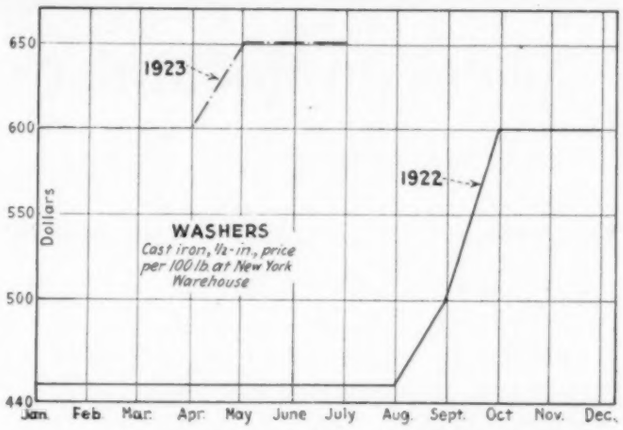


FIG. 4—TREND OF PRICES OF CAST IRON WASHERS

Washers.—Cast iron washers, ½-in., are quoted at $6.50 per 100 lb. at New York warehouses, which price has held since March of the current year. The present level is 50c. per lb. above the high peak of 1922, which occurred during the last quarter of that year, and represents a rise of $2.10 per 100 pounds above July, 1922.

Demand for iron products has picked up considerably with the beginning of July. Favorable signs are evident, particularly in the pig iron market.

Oils.—Lard-cutting oil is quoted at 65c. per gal. at New York warehouses, or at exactly the same level as prevailed between February and June of last year. This commodity, in the meantime, dropped to 50c. between December, 1922, and February of the current year. Machine and engine lubricants are in good demand but with no tendency on the part of buyers to accumulate reserves. The present price level for medium-bodied machine oil is 29.7c. per gal. at New York, against 45c., between January and June of last year. The present price is the lowest quoted since January, 1922.

Cotton Waste.—Present price levels have remained the same since February of the current year, despite curtailment in the textile mills. The current rate of 10c. to 13c. per lb. for white cotton waste at New York warehouses is about 1¼c. above the price prevailing at the opening of the year and 2¾c. higher than a year ago.

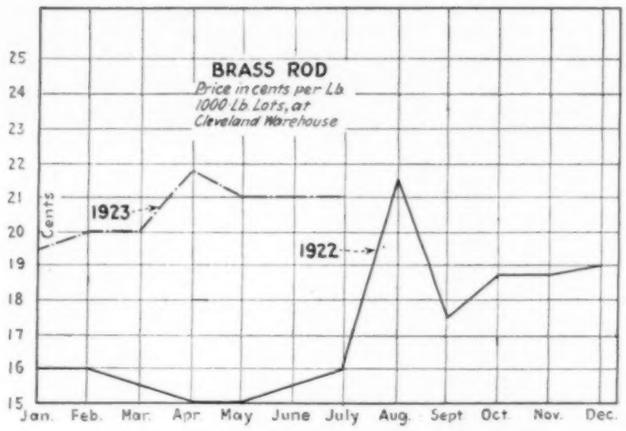


FIG. 2—TREND OF PRICES OF BRASS RODS

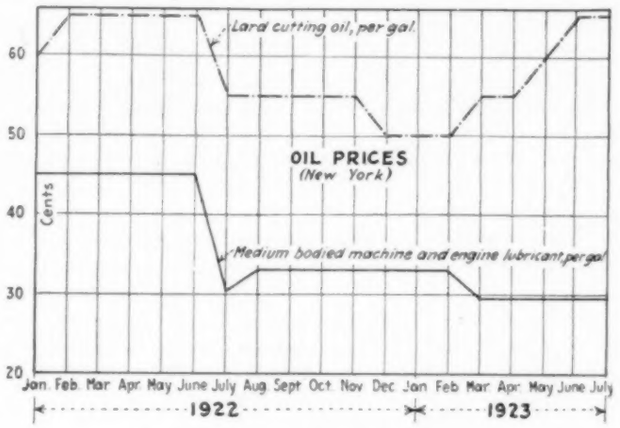


FIG. 5—TREND OF OIL PRICES

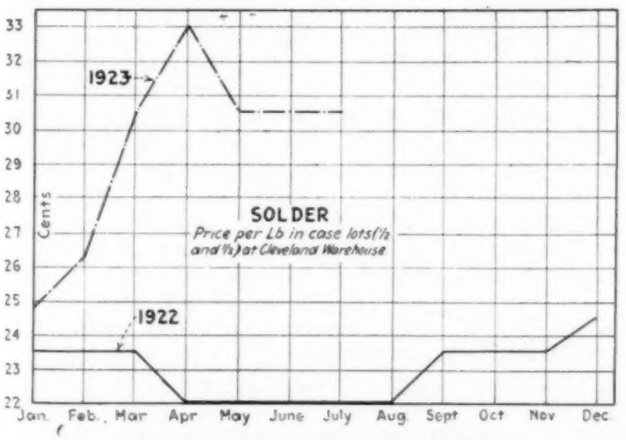


FIG. 3—TREND OF SOLDER PRICES

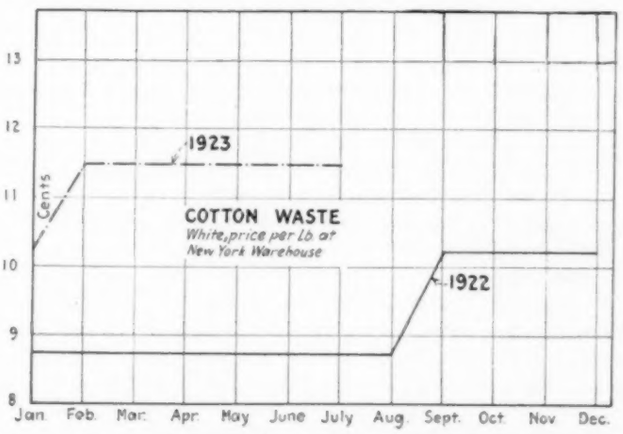


FIG. 6—TREND OF COTTON WASTE PRICES

American Machinist
Established 1877
KENNETH H. CONDIT AND FRED H. COLVIN
Editors

July 19, 1923

The Shop Equipment Review— A New Feature of American Machinist Service

THERE WAS a time, and not so many years ago, when an ordinary human being could keep in his head a complete index of all the machine tools in existence. The man in need of a new machine had but few makers and fewer styles to choose from. A few lathes, drill presses, planers, slotters, shapers and milling machines, with one or two vertical boring mills thrown in, comprised the entire list. Gear cutting was done by the pattern maker or in the foundry. Now it takes an expert to enumerate the different types and makes of gear cutting machines and to decide which type to use for certain requirements.

At that time grinding machines were confined to the now almost forgotten wet grindstone. Here and there an emery wheel began to show itself in a timid fashion. Now we have more varieties, styles and makes of grinding machines than there were different machine tools of all kinds at that time.

Screw machines were a promise for the future only. Now a man is often hard put to decide which type he shall use, not because of a difference in workmanship or size or price, but because they have been developed and differentiated to such a point that only the man with a thorough knowledge of them all can decide which type or make promises the greatest economy for a given piece of work.

This difficulty of choosing wisely presents itself every time a new machine must be bought. It is not reasonable to expect that a man shall have a clear picture in his mind of all the features of all the existing machine tools. And yet this is necessary if he wants the best value for his money, and especially if he wants the greatest possible production from his men and equipment.

Catalogs? Yes, they help, but most catalog files are incomplete because the collector did not know all the makes and makers and consequently could not ask for their literature. Even if he had a complete file at one time it soon became incomplete and out of date.

The salesman? Yes, he helps too, but he is not going to recommend a thread hobbing machine when he handles thread milling machines only, and vice versa.

This difficulty on the part of the user of having before nim a complete résumé of all machine tools in existence and of their special features and relative values for a given piece of work was realized by the *American Machinist* and one or more pages were given to the "Condensed Clipping Index of Equipment." The idea was that the man responsible for the equipment of the shop could clip the items and file them according to his needs. The idea was good, but not good enough. If a single issue of the *American Machinist* was lost or overlooked, the file was incomplete. Besides few busy men have the time to make such a file and keep it up. Then again, unless it is made up in a very handy form, the various clippings pasted on substantial sheets, and numbered and indexed, such a file is not easy to handle. As a result enthusiasm oozes out and the whole scheme is dropped.

The *American Machinist* realized this and made a study of the possible means of putting the valuable information, contained in the "Shop Equipment News" in a form whereby it would become of permanent use to the machine tool buyer.

The present issue is the result of this study. All of the machines, attachments, gages, jigs, tools, fixtures, in short, everything which found a place in the "Shop Equipment News" of the first six months of 1923 has been collected and is reviewed in these pages. It is the intention to give such a review semi-annually. The various items are classified and an index is provided which locates the items. To still further facilitate the finding of a single item, the index gives a sub-classification. Whereas, for instance, the reading matter contains a heading "Drilling Machines," the index goes a step further and mentions "Upright Drills," "Radial Drills," etc. The individual items are placed chronologically, that is, in the order in which they were originally published in the *American Machinist* and are given reference numbers.

The entire section can be lifted out and filed. It should be an easy matter to find a resting place for these pages, a place where they can readily be found, when needed. There is no weekly clipping and filing to be done, there are no numerous little pieces of paper to be taken care of and there is no need of sorting, classifying and indexing them. Keeping the entire section on file will enable a man to see the progress of a certain kind of machine tool at a glance.

The "Review" will make it easy to keep the catalog file up to date, for every item in it calls for new literature, be it a little folder or an entirely new catalog. All that the buyer has to do is to send out circular letters to all the makers mentioned in the review, that is if their product is of interest to him, and request literature on the subject mentioned in the "Shop Equipment Review."

Looking over a few new machines or tools from week to week does not give one the perspective of the development of the machine tool. On the other hand, looking at all the things brought out in the last half year does give such a perspective. Developments come rapidly nowadays and a half year is time enough to indicate the trend. The Shop Equipment Review is the ready means of comparing and recording them. It is not a substitute for the Shop Equipment News Section or the advertising pages but a periodical compilation of the information contained in them.

It is well that the man responsible for the equipment, and consequently for the production in a shop, should have this broad view of the trend of the times, so as to allow him to get the best and latest and yet steer clear of untried and dangerous novelties. It is believed that the Shop Equipment Review will give him the means to get this broad perspective.

American Machinist Shop Equipment Review

Semi-annual résumé of machines, tools and accessories described in the Shop Equipment News section of the American Machinist during the first six months of 1923

Principal Developments of the Present Year

By L. C. MORROW
Managing Editor, *American Machinist*

BY WAY of introduction to our initial semi-annual shop equipment review let us recall in the briefest way the general changes in machine tool design taking place over a period of 35 or 40 years. It is necessary to pass from the type of light-weight, spindle leg, ornamental machine, through a continual evolution during which ornamentation was lost; weight was added; legs were strengthened or changed into bases and cabinets; bearing sizes were increased; spindles were made hollow; cones were reduced in number of steps and the steps made wider; and many similar changes were made. The limit to design was the strength of the cutting tool. Further changes resulted from the development of high speed steel. A general strengthening was necessary; single pulley and direct motor drives were introduced; the geared head came into its own; and the quick-change feed mechanism was highly developed. The more recent changes in machine design are part of a familiar story.

It can easily be seen that changes in design during a given six months might be so few and so unimportant that they could not be considered to point out any tendencies. That is not true of the first six months of 1923; there have been definite tendencies.

The machine special to war work, an outstanding feature as late as 1919, has of course, been dropped, yet there has been a noticeable increase in the use of special machinery, with the tendency away from the strictly single-purpose machine but toward fitting the machine to the job. It is a production improvement of merit. While not in any way limited to special machinery, mention must be made in connection with it of the increased use of the single pulley drive, individual motor drive, full or semi-automaticity, and transmissions of the automotive type. These features are characteristic also of 1923 so-called "standard" machines and when translated into results mean power, flexibility and convenience, long life, resistance to shock, and conservation of human power.

The automatic feature has been developed rapidly during 1923 both to make the workmen's labors easier and of necessity to get along without so many of them, since natural and legislative causes have reduced their number. January to July has seen the introduction of two outstanding automatic milling machines, six or more automatic grinding machines, semi-automatic and automatic lathes for work between centers, and several of the full automatic machines which carry the term automatic as a definitive part of their names. Related to the automatic machine is the station type which continues popular and in which development and improvement go on.

The adoption of features applicable to both automatic and hand operated machines has been noticeable. There have been increases in the development of safety devices, their importance becoming more and more recognized; in the use of brakes to quickly stop revolving spindles, a great time-saver; in the use of roller and ball bearings; in the adoption of hydraulic feeds, and hydraulic drives in the case of two broaching machines; and in the use of the rapid traverse for heads, cross-rails and tables. Fool-proof construction has been highly developed and simplicity has been kept well in the foreground. A notable example of simplicity in design is the 4-gear hobbing machine, and it is worthy of note that the design of that machine was extensively influenced by the customer interested in its purchase.

Grinding machinery has developed rapidly. The adoption of automatic operation has been mentioned. Another important tendency is the growing use of the centerless grinding method. The double-head internal machine has found a place. Automatic gaging has been extended. Maintenance machines for grinding single point lathe, shaper and planer tools, and others for the circular tools, such as hobs, have been brought out. Gear grinding machines have established their worth and reliability and further developments are on the way.

The first half of 1923 has seen increased use of the open-side planer; a leaning toward the crank press for hot pressing and hot forging (the effect of automobile practice); the development of washing machines for metal parts; steady improvement in materials handling machinery; a notable increase in number and quality of tools especially adapted to automobile repair work; and the development of machines for more economical railway work. The makers of gas and electric furnaces and hardening equipment in general have brought out important improvements.

Portable tools this year have had increased use, their reduced prices influencing sales. Multiple-spindle drilling heads have gained in favor. The progress in the standardization of jig bushings and other parts has been promising.

Measuring instruments include among the additions to their family the expanding inside micrometer, the recording scleroscope, gear tooth testing devices, gage blocks, hardness testing devices, and a number of dial gages.

Nineteen-twenty-three so far hasn't made a bad showing in the shop equipment field—better than a great many of the men behind the guns realize, perhaps. If the second half of the year produces as well, and the indications are all in favor of its doing so, there will be excuse for more than mild congratulation.

Contents of the Review Pages

	No.	Page
Boring Machines	**1–5**	**85**
Vertical	1–3	85
Portable	4	85
Attachment	5	85
Drilling Machines	**6–24**	**85**
Upright	6	85
Sensitive	7–10	85
Radial	11	86
Multiple-Spindle	12–17	86
Attachments	18–24	87
Grinding Machines	**25–52**	**88**
Cylindrical	25–26	88
Face	27–28	88
Gear	29	89
Internal	30–35	89
Surface	36–38	90
Belt	39	90
Tool and Cutter	40–48	90
Attachments	49–52	91
Honing and Lapping Machines	**53–60**	**92**
Honing	53	92
Lapping	54–57	92
Hones	58–60	92
Lathes	**61–83**	**93**
Engine	61–69	93
Turret Lathes and Screw Machines	70–73	94
Special	74–77	95
Double End	78–79	95
Attachments	80–83	96
Milling Machines	**84–90**	**96**
Horizontal	84–86	96
Vertical	87	96
Planer-Type	88	97
Attachments	89–90	97
Planers, Shapers and Slotters	**91–97**	**97**
Planers	91–94	97
Shapers	95	98
Slotters	96–97	98
Presses	**98–120**	**98**
Arbor	98–101	98
Broaching, Assembling and Straightening	102–103	99
Punching	104	99
Drawing and Stamping	105–106	99
Brake	107	100
Forging	108	100
Heading	109	100
Horning and Wiring	110	100
Dies	111–114	100
Attachments	115–120	101
Threading Machines	**121–131**	**101**
Tapping	121–123	101
Threading Lathe	124	102
Thread Generating	125	102
Thread Milling	126	102
Thread Hobbing	127	102
Pipe Threading	128	102
Attachments	129–131	102

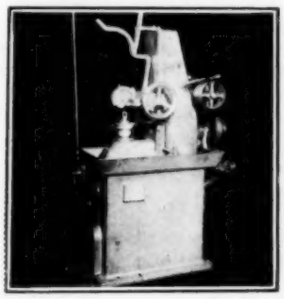
	No.	Page
Other Machines	**132–157**	**103**
Bending	132–133	103
Broaching	134–135	103
Bundling	136	103
Combination Tool	137	103
Cutting and Measuring	138	104
Filing	139	104
Flexible Shaft	140–141	104
Hammers	142–143	104
Hobbing	144	104
Molding	145	105
Quenching	146	105
Riveting	147–148	105
Sandblasting	149	105
Sawing	150–151	105
Screwdriving	152	105
Shearing	153–154	106
Soldering	155	106
Washing	156	106
Welding	157	106
Measuring, Gaging and Testing Equipment	**158–185**	**106**
Rules	158–159	106
Micrometers	160–161	106
Gage Set	162	107
Dial Indicators	163–165	107
Indicating Gages	166–172	107
Gear Testing Machines	173–174	108
Thread Gages	175–176	108
Hardness Testing Machines	177–179	109
Material Testing Machines	180–181	109
Speed, Time and Temperature Indicators	182–184	109
Level	185	110
Material-Handling Equipment	**186–196**	**110**
Shop Trucks	186–190	110
Cranes and Hoists	191–194	110
Garage Jacks	195–196	111
Woodworking Machines	**197–204**	**111**
Lathes	197–198	111
Surfacer	199	111
Saws	200–204	112
Small Tools	**205–233**	**112**
Hand Tools	205–215	112
Cutting Tools	216–227	113
Machine Attachments	228–233	115
Miscellaneous	234–235	116
Miscellaneous Equipment and Supplies	**236–265**	**116**
Machine Attachments	236–238	116
Machine Fittings	239–243	116
Materials	244–246	117
Shaft Hanger	247	117
Electrical Equipment	248–252	117
Pumps	253–255	118
Compressors	256–257	118
Heat-Treating Equipment	258–259	118
Acetylene Generator	260	119
Blowtorch	261	119
Foundry Equipment	262–263	119
Floor Marking Machine	264	119
Protective Clothing	265	119

Boring Machines

— 1 —

Lathe, Vertical, Piston, Zimmerman. *Production Machinery Co., Inc., Main & Horton Sts., Jackson, Mich.* [A. M., vol. 58, p. 316.]

The machine is intended especially for work on pistons. It is shown equipped for taking a finishing cut on the head of the piston with a tool, and then passing an



abrasive wheel over the head to give it a highly finished surface. It can be adapted for performing other operations, such as boring and facing the open end of the piston, turning, facing the head and cutting the ring grooves. All the mechanism for the operation of the machine is contained in one unit in the upper portion. The piston is held down by an air chuck mounted on the lower end of the spindle. The work can be provided with six changes of speed. A power feed unit with six changes of both vertical and cross feed can be supplied. Work up to 14 in. long by 10 in. in diameter can be handled. Floor space of single-spindle machine, 24x48 in. Weight, about 2,400 lb. net.

— 2 —

Boring and Turning Machine, Vertical, Continuous, Multiple-Spindle. *Davis & Thompson Co., Milwaukee, Wis.* [A. M., vol. 58, p. 813.]

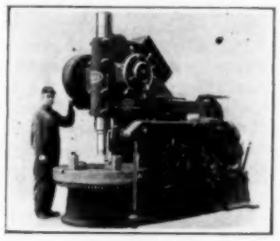
The machine is intended for simultaneously boring and turning piston-ring pots and similar work. It is of the vertical type and consists prin-

cipally of a central column around which the work table and tool spindles revolve, together with the necessary operating mechanisms. The upper part of the machine, or turret, does not index, but revolves continuously with the work table. The machine carries six tools and six rough castings, and produces six finished pieces with each complete revolution of the table. The process of chucking the work consists of but one operation. Each spindle is 5 in. in diameter and runs in a nut, which by a system of differential gearing and a tripping mechanism is caused to feed and withdraw automatically. Each spindle carries three tool bits for turning the outside of the work and three more for boring the inside. The maximum spindle travel is 18 in. on the machine shown, and the largest diameter of work that can be accommodated is 8 in. The machine can be belt or motor driven. Floor space, 4x6 ft. Weight, 9,500 pounds.

— 3 —

Boring Machine, Car Wheel, Vertical, Motor-Driven 48-Inch. *Niles-Bement-Pond Co., 111 Broadway, New York, N. Y.* [A. M., vol. 58, p. 820.]

The machine embodies a number of features tending toward increased production and safety. An automatic self centering chuck is employed. After the car wheel has been swung into place by the motor-driven crane supplied with each machine, the driving motor is started at



slow speed and causes a mechanism in the table to move the chuck jaws inwardly until they engage the wheel tread. When the work is firmly chucked, the table commences to rotate, and the driving force employed after the cutting operation begins serves to further lock the wheel in the chuck jaws. Upon finishing a job the motor is reversed, and the relative motion between the driving gear and table serves to loosen the jaws and withdraw them. The machine uses reversing motors.

— 4 —

Boring Bar, Portable Outfit. *H. B. Underwood & Co., Philadelphia, Pa.* [A. M., vol. 58, p. 891.]

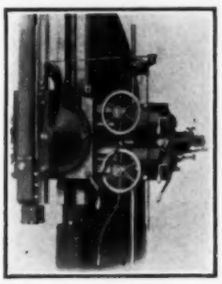
The outfit is particularly adapted for reboring pump cylinders and air compressor cylinders, either detached or in position on locomotives. The outfit consists of a cutter head and a bearing plate that carries a boring bar, driving spindle and feed screw and that is mounted on a clamping ring. A Morse taper shank on the driving spindle fits the portable electric or pneumatic motor. The feed mechanism operates automatically. To return the cutter head to the top of the cylinder, the motor is placed on the shank of the reverse gear. A gage provides a method of setting the tool. The outfit is made in sizes. The weight of the equipment

without the motor, with a capacity to bore from 8¼ to 11 in. in diameter by 12 in. stroke is 140 pounds.

— 5 —

Boring Mill, Hand Feed Levers, "Maxi-Mill." *Bullard Machine Tool Co., Bridgeport, Conn.* [A. M., vol. 58, p. 641.]

The "Maxi-Mill" boring mill has been equipped with hand feed levers mounted at both ends of the rail. The operator can thus feed the



tools by hand when starting cuts or when making heavy cuts, and at the same time he can stand in position to closely observe the cut. The length of the levers permits the operator to guide the cutter with greater ease and accuracy when following a form templet. The teeth on the hand lever engage the teeth of the clutch on the hub of the handwheel when the lever is moved forward slightly. The lever automatically disengages.

Drilling Machines

— 6 —

Drilling Machine, Upright, 20-Inch. *Superior Machine Tool Co., Kokomo, Ind.* [A. M., vol. 58, p. 638.]

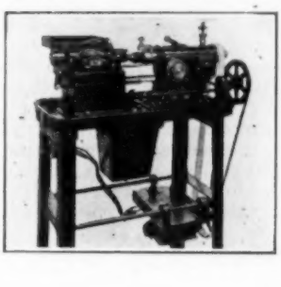
Six types of the machine are available, depending upon the type of drive and feed. A grooved table for coolant and a pump can be furnished. The B1 machine illustrated is equipped with cone drive, back-gears, geared feed and both wheel and pilot hand feeds. With the back-

gears in use, the spindle feeds vary from 25 to 226 r.p.m.; and without, from 97 to 875 r.p.m. Six spindle feeds are possible, from 0.005 to 0.018 in. The machine occupies a floor space of 16x47 in., and 16x54 in. with a motor drive. The maximum height is 79 in. A geared motor drive is applicable to all types. Net weight of B1 machine, 790 pounds.

— 7 —

Drilling Machine, Sensitive, Automatic, with Indexing Fixture No. 59. *Kingsbury Manufacturing Co., Keene, N. H.* [A. M., vol. 58, p. 351.]

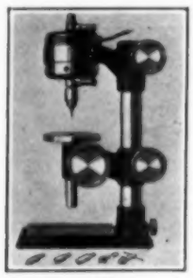
The automatic indexing fixture is here shown used in conjunction with the No. 8 automatic, horizontal, sensitive drilling machine. The complete unit is designed for cross drilling small work such as binding posts, rivets and irregularly shaped pieces. The dial feed reduces the work feeding time, while the drilling is accomplished as rapidly as on a high-speed hand machine. The automatic indexing fixture has a dial containing twelve stations and is indexed by means of a cam cut on the friction cam wheel which controls the feed of the drill. The work is laid on the dial and is automatically clamped in the drilling position. The machine is equipped with a ¾-hp. motor.



— 8 —

Drilling Machine, Sensitive, Electric, Bench, "Dumore." *Wisconsin Electric Co., Racine, Wis.* [A. M., vol. 58, p. 388.]

The machine is adaptable to small work where accuracy and sensitiveness are re-



quired. The feed of the 3½-in. work table is sensitive in that it is operated by a rack and pinion feed. The center of the table is 3 in. from the vertical column of seamless steel tubing, and it is bored and reamed to fit the shanks of the drilling fixtures shown. A No. 9 Jacobs chuck is used, with a capacity up to ½ in. The Dumore universal motor can be raised and lowered on the column or it can be detached and used as a hand portable drill. The height over-all is 16 in. The machine is operated by means of a foot control'ed rheostat and provides six speeds.

— 9 —

Drilling Machine, Sensitive, Bench, Heavy-Duty, No. 2. *Burke Machine Tool Co., Conneaut, Ohio.* [A. M., vol. 58, p. 499.]

The frame is cast in one piece. The adjustable table is 10x10 in. inside the oil channels, has a vertical travel of 10¾ and can be swung around the column, which is 3 in. in diameter. The spindle is ¾ in. in diameter, has a ball thrust

bearing and a vertical travel of 4 in. Four-step cone pulleys are provided. The cone and drive pulley belts are, respectively, 1½ and 2 in. The drilling capacity ranges up to ⅞ in. and work up to 12 in. in diameter, can be drilled in the center. Floor space, 32x12 in. Height, 39 in. Maximum distance: spindle to table, 10¾ in.; spindle to base, 18½ in. Weight, 170 pounds.

— 10 —

Drilling Machine, Sensitive, Electric, Bench, Type A, "Dumore." *Wisconsin Electric Co., Racine, Wis.* [A. M., vol. 58, p. 643.]

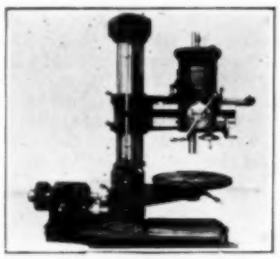
The machine is adapted for fast drilling on work that requires a high speed and a sensitive drilling machine. Raising the table by means of the lever feeds the work to the drill. The machine is equipped with a Dumore universal motor. A foot-controlled rheostat provides a means for regulating the

spindle speed. A No. 0 Jacobs chuck is used. The machine is capable of drilling a ⅛-in. hole in steel.

— 11 —

Drilling Machine, Radial, High-Speed, 2- and 2½-Foot. *American Tool Works Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 956.]

The two sizes will drill in the centers of circles 47 and 59 in. in diameters, respectively. The head of the machine is of a double-drive,



back-geared type, which provides two rates of spindle speed for each speed secured through the cone pulley or six-speed gear box. The twelve speeds thus provided cover a range of from 50 to 900 r.p.m. The head mechanism is fully enclosed in one large, oil-tight housing. Four feeds are provided from 0.0 to 0.016 in. per spindle revolution. An adjustable friction protects the feed mechanism. The speed box is of the cone and tumbler type with an automatic clutch auxiliary drive which keeps the shafts and gears running while the speed changes are made. A 5-hp. motor is recommended for motor drive. A centralized lubri-

tem is employed. The machine can be equipped with a constant-speed motor driving through the speed box, with a variable-speed direct-connected motor, or with a double-friction countershaft.

— 12 —

Drilling Machine, Horizontal, Multiple-Spindle, High-Production. *Davis & Thompson Co., Milwaukee, Wis.* [A. M. vol. 58, p. 88.]

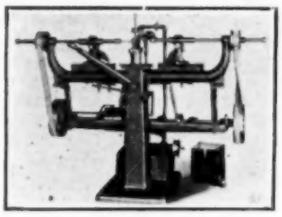
The machine will drill, tap, ream, thread or box-mill the opposite ends or sides of a piece of work simultaneously. Multiple heads can be used on the spindles for drilling several holes at once in each part. The cylindrical turret carries the twelve work spindles and revolves continuously. The turret does not index, but the tools operate while the turret is in motion. The position of each spindle can be adjusted. The entire mechanism is gear-driven, any spindle or turret speed being obtainable. The barrel carrying the cam is held stationary while the turret, spindles and end plates re-

volve. The work is secured by clamps forced in place automatically by means of a wire cable. The machine is ordinarily supplied with a driving pulley, but can be furnished complete with a motor. The bearings are flooded with oil by means of a force pump. Lubricant is automatically brought to the tools through the spindles while the cuts are being taken. Floor space, 4x10 ft. Spindle travel, 14 in. Weight, 1,700 pounds.

— 13 —

Drilling Machine, Opposed-Spindle, Sensitive, Horizontal. *Francis Reed Co., 41 Hammond St., Worcester, Mass.* [A. M. vol. 58, p. 206.]

The machine is intended for drilling from opposite sides two holes placed close



together. The speed and the ease of operation are the principal features of the machine. The spindles are fed toward the center simultaneously by means of the large lever. The adjustable compression springs prevent the pressure on the drills from becoming excessive. The positions of the heads ar adjustable horizontally and one head has a vertical adjustment. The work holder is cam operated, and is arranged to function in conjunction with the hand lever. The operator feeds the work to the fixture with one hand, and feeds the drills forward with the other.

— 14 —

Drilling and Tapping Machines, Multiple-Spindle, Sensitive. *Langelier Manufacturing Co., Arlington-Cranston, R. I.* [A. M. vol. 58, p. 606.]

Two machines have been developed for drilling and tapping the terminal boxes used on electric wiring. The machine shown drills four holes simultaneously and taps them in a succeeding movement, without removing the work from the machine. The work is held in a sliding fixture. Two opposed spindles at the front of the machine each carry a two-spindle drilling unit. The two tapping spindles at the rear of the machine also carry two auxiliary spindles each. The drilling spindles are actuated simultaneously by hand levers. The jack shaft drives the tapping spindles in opposite directions by means of short belts. The reversing clutch is connected with the

treadle. Floor space, 5x2½ ft. Weight, 1,100 pounds.

Another machine has been developed for the same class of work where there is but a single hole to be drilled and tapped. There are two vertical spindles and reversal of the tap is accomplished by a Jarvis tapping chuck. The work holding fixture slides sidewise from the drilling to the tapping spindle. The machine occupies a bench space of 1 ft. 6 in. x 1 ft. 3 in. and weighs 250 pounds.

— 15 —

Drilling Machine, Two-Spindle, Vertical, High-Duty, Nos. 101 and 102. *Foote-Burt Co., Cleveland, Ohio.* [A. M. vol. 58, p. 962.]

The machine can be used for simply drilling holes, or

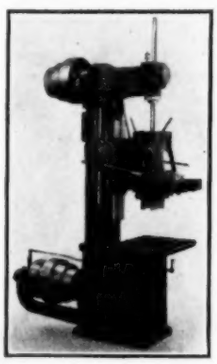
for the performance of such successive operations as drilling and spot facing or reaming. The frame of the machine consists of a base unit and a head unit, between which pedestals are fitted at each side. Four 2-in. bolts extend from the bottom to the top of the machine. When two similar operations are to be performed, a two-station fixture is mounted on the work table. This ar-

rangement enables two pieces of work in one fixture to be under the two spindles, while the finished pieces are removed from the other fixture. Where two successive operations are being performed the table is indexed 120 deg. at each movement, the work being set up at one station, while the first operation is progressing in the second station and the final operation at the third station. Gears are provided in sets to furnish spindle speeds from 43 to 304 r.p.m. Take-off gears afford a range of feeds from 0.006 to 0.168 in. per revolution. The use of two helical pinions and racks for feeding each spindle gives a smooth feed movement. The centrifugal pump has a capacity for delivering 45 gal. of coolant per minute.

— 16 —

Drilling Machine, Multiple-Spindle, No. 12-A. *Fox Machine Co., Jackson, Mich.* [A. M. vol. 58, p. 964.]

The machine is designed especially for small high-speed drills and has a driving

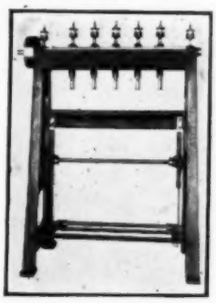


capacity of 10 hp. A motor can be mounted on a bracket in place of the lower cone pulley. In the cone pulley drive type the lower cone is carried on a countershaft which runs in Hyatt bearings and is driven by an Edgemont clutch. The yoke that carries the upper drive pulley also carries the feed gearing. There are three changes of feed by means of sliding gears. The head illustrated is 12 in. in diameter and carries 12 spindles, ⅞-in. in diameter, which can be located to drill at any point within the 12-in. circle. The head is counterbalanced by a weight carried in the column. The spindles have vertical adjustment. Weight 3,070 pounds.

— 17 —

Drilling Machine, Gang. *C. L. Hawes, 12 Adams St., Ashtabula, Ohio.* [A. M. vol. 58, p. 965.]

The spindle drive is through hardened and ground helical gears, each spindle being mounted in an individual head and equipped with ball thrust bearings. The heads



can be moved to any desired position on the cross rail, the minimum distance between spindle centers being 1¾ in. The work table is fed upward by racks and pinions and may be controlled by either hand or foot. Automatic feed can be furnished. Height from floor to center of drive shaft, 52 in. Length of table, 35 in. Maximum distance from table to spindle, 9 inches.

— 18 —

Drilling Head, Multiple-Spindle, Adjustable. *Sellew Machine Tool Co., 28 Bayley St., Pawtucket, R. I.* [A. M. vol. 58, p. 51.]

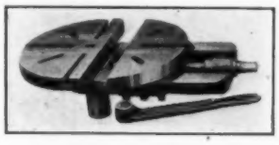
Each spindle arm of the drilling head is held in position by means of two bolts, the one about which the arm swings being permanent and the other being a removable

locating and clamping bolt. The latter bolt is inserted in the hole desired to give the correct set-up, and the arm with its spindle is then locked in place. The body of the head is attached to the quill of the drilling machine, and the central driving gear is fitted on the outside of the nose of the drilling machine spindle. The head is made in several sizes, and to suit the special requirements of the work that is being performed.

— 19 —

Drilling Machine Table and Vise, Combination. *Modern Machine Tool Co., 601 Water St., Jackson, Mich.* [A. M. vol. 58, p. 203.]

This attachment for a drilling machine serves both as a table and as vise, and can be fitted in place of the stand-

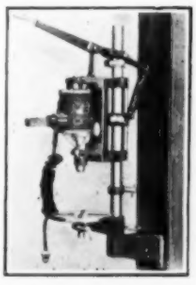


ard table. The table is 19 in. in diameter; the vise can be opened 10 in., so that the table then has a size of 19x29 in. A shank fits in the table socket in such a way that the attachment can be swiveled. It is not necessary to secure a vise to the table of the machine, as work can be clamped directly in the table. When the vise is opened only a small distance, shafts can can be laid in the groove. The table is provided with four T-slots and has hardened jaws.

— 20 —

Stand, Post, Portable Electric Drill. *Standard Electric Tool Co., Cincinnati, Ohio.* [A. M. vol. 58, p. 747.]

The stand can be mounted on a wall or post and it enables a portable electric drill to serve as both a stationary and a portable device. The bracket which holds the drill-

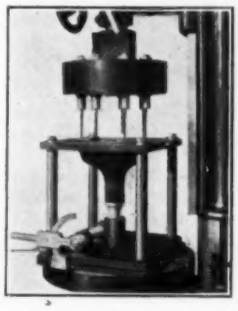


ing machine can be fitted at any point on the column. A quick return and easy feed motion are claimed, due to the method of mounting the lever and spring. The slotted 9 in. table can be adjusted to any point on the column. A vertical adjustment of 15½ in. is provided for the bracket that holds the drill, while the latter has a travel of 3½ in. Height, 36 in. Weight, 75 pounds.

— 21 —

Jigs, Drill, Quick-Acting, Universal, Types A and B. *Cleveland Universal Jig Co., 2005 Oregon Ave., Cleveland, Ohio.* [A. M. vol. 58, p. 821.]

The Type A jig not shown here takes the place of a screw bushing type of jig. By means of racks and pin-



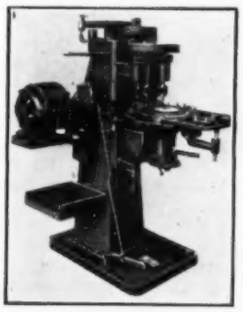
ions operated by a hand lever, two plungers can be operated up and down and locked in any position. The work is clamped under the top plate, which is mounted on the plungers and carries the drill bushing.

The ordinary leg and box type of jig is replaced by the Type B jig shown set up to drill the bolt holes in a bell-shaped casting. The top plate is bored to receive drill bushings. The same handle and rack and pinion movement is used as in Type A, but there is only one plunger moving upward to hold the work against the top plate. By changing bushings and plates many parts can be held.

— 22 —

Drilling Attachment, Automatic Tapping Machine. *Anderson Die Machine Co., 544 Iranistan Ave., Bridgeport, Conn.* [A. M. vol. 58, p. 888.]

This attachment converts the Anderson multi-spindle, continuous, dial-feed tapping machine into a drilling ma-



chine. Nuts or small parts that require to be drilled and tapped may have both operations performed on the machine. Part of the mechan-

ism for reversing the spindles when the machine is used for tapping may be removed as a unit from the top of the machine. By substituting a large spur gear the spindles are given a continuous and uniform rotative movement in one direction only. The up and down movement of the heads remains the same as when the machine is used for tapping. The starting switch is connected to the treadle, so that the machine runs only when the operator stands in his usual position.

— 23 —

Jig, Drill, Universal, Single-Pillar, Self-Clamping. *George A. Gloor.* 646 *Catherine St., Detroit, Mich.* [A. M. vol. 58, p. 891.]

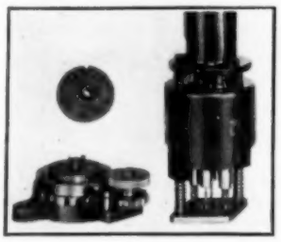
Locating fixtures for any kind of work can be attached to the base of the jig, and bushings for any size hole can be attached to the top plate. The top plate slides on a vertical shaft and is held down against the work by means of a spring. Bearing down on the handle end of the lever raises the top

plate so that the work can be located in the jig. When the lever is released, the spring forces the top plate down onto the work and holds it in position for drilling. The jig is adaptable for a large variety of work by changing the bushing and adapter.

— 24 —

Drilling Head, Multiple-Spindle, with Work Fixture. *John H. Dorman,* 5148 *Hudson Blvd. West, West New York, N. J.* [A. M. vol. 58, p. 957.]

The drilling head and jig were designed for drilling holes in plates such as those used in meat choppers. The plate shown is 3⅞ in. in diameter, ⅛ in. thick and has 160 ¼-in. holes drilled in 8 circles of 20 holes each. Since the center distances between the holes are too small for the drilling to be done in one operation, alternate holes are drilled in each circle on



opposite sides of the plate, and the drilling completed by indexing the plate 20 times. The indexing jig plate is made of machine steel and has hardened steel bushings. The housing of the head is aluminum. The speed ratio is 2¼ to 1. Heads and jigs can be furnished with spindles spaced to suit different layouts.

See Threading Machines, Tapping.

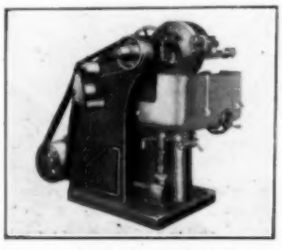
See Small Tools for Cutting Tools and Attachments.

Grinding Machines

— 25 —

Grinding Machine, Centerless, Cylindrical, Heavy-Duty, No. 4B. *Detroit Machine Tool Co.,* 6545 *St. Antoine St., Detroit, Mich.* [A. M. vol. 58, p. 819.]

The machine is intended for grinding straight cylindrical parts on a high production basis. Two abrasive wheels are used, the upper for grinding and the lower for rotating and feeding the work. The feed wheel may be pivoted to vary its angle with the grinding wheel any amount up to 10 deg., thus changing the traverse speed of the work. Control of the cut of the grinding wheel is obtained by raising or lowering the entire feed wheel unit. By means of sliding change gears, grinding wheel speeds of 33 and 44 r.p.m. are provided. The 9x8-in. feed wheel is driven direct from the change gear box; the 18x4-in. grinding wheel is driven by a belt from the change gear box pulley. The ball-bearing pulley drives the wheel spindle through a flexible coup-

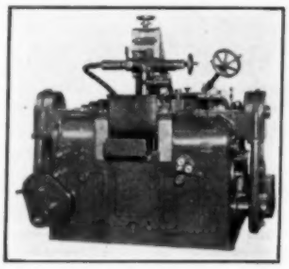


ling and does not transmit the belt pull to it. Diamond truing devices are integral parts of the machine. Either belt or motor drive can be furnished; a 10-hp 1,200 r.p.m. motor is required. The grinding capacity is up to 4 in. in diameter and 16 ft. in length. Floor space, 69x54 in. Weight, 5,000 pounds.

— 26 —

Grinding Machines Cylindrical, Automatic, Nos. 132-A and 142. *Warren F. Fraser Co., Westboro, Mass.* [A. M. vol. 58, p. 927.]

The work is fed to the grinding wheel from a stack or chute. The operation is fully automatic, a work piece being taken from the bottom

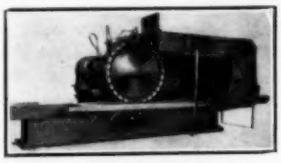


of the stack by the work carrier, placed between centers, ground to diameter and passed to the delivery chute at each cycle of the machine. Each machine has two work spindles, both turning in the same direction and at the same speed. The wheel-head of the smaller or No. 132-A machine is mounted upon a slide given an intermittent forward and backward movement by means of a cam. The wheel spindle is caused to traverse endwise for a very short distance only. The larger or No. 142 machine shown is of greater capacity. The wheel runs in eccentric bearings that are susceptible to a rocking motion to carry the wheel to and from the work. The smaller machine carries a wheel 4 in. wide, the maximum length of work, and it will handle pieces up to 3 in. in diameter. The larger machine may have a wheel 6 in. wide, and handles work larger than 3 in. in diameter. A complete circulation system for grinding compound is provided. The No. 132-A machine occupies a floor space of 6 ft. by 5 ft. 4 in., and weighs 5,000 lb.; the No. 142 machine 7 ft. by 5 ft. 2 in. and 8,000 pounds.

— 27 —

Grinding Machine, Face, Heavy-Duty, 66-Inch. *Diamond Machine Co.,* 9 *Codding St., Providence, R. I.* [A. M. vol. 58, p. 564.]

The machine is designed particularly for grinding large work such as boiler sections up to 60 in. in height. The abrasive wheel is of the sectional type and is 66 in. in diameter. It consists of 28 blocks of 2-in. face and 7¼ in. depth, each held rigidly in a chuck. A wheel dresser built on the machine can be used while the machine is in operation. A driving motor of 75 hp. is used. The drive from the motor to the wheel is by a Morse silent chain, giving a speed of 180 r.p.m. to the wheel. An automatic system is provided for handling the coolant, which is stored in a

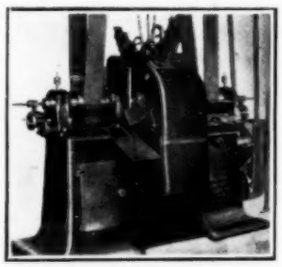


tank of large area at the rear. The table has a platen 36x110 in. in size; it has a speed of 22 ft. per min. An arrangement of belts and pulleys within the bed reverses the motion of the table. Weight, over 40,000 pounds.

— 28 —

Grinding Machine, Face, Automatic, Double, No. 2. *Gardner Machine Co., Beloit, Wis.* [A. M. vol. 58, p. 673.]

The machine has two 18-in. abrasive wheels. It is intended for the rapid grinding of pieces having two parallel sides that require finishing, such as piston rings and bearing races. The parts to be ground are carried to the working position by means of a work carrier which passes between the grinding members. The latter are offset in relation to each other, so that grinding is done on the back face of one wheel and the front face of the other. As the carrier brings the work into the grinding position,

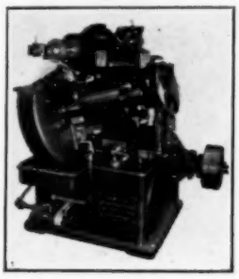


one of the grinding members automatically advances until it reaches a positive stop, being fed by spring pressure. The grinding heads are mounted on sub-bases that are adjustable for position by means of a handwheel. The grinding members consist of either steel disk wheels or abrasive ring wheels carried in "Perfection" chucks, for dry or wet grinding, respectively. Devices for truing the members are integral with the machine. For wet grinding the coolant is carried through the hollow spindles. A 15-hp. motor is used. Floor space 4x8 ft. Weight boxed, 4,250 pounds.

— 29 —

Grinding Machine, Spur Gear, Automatic. *American Grinder Co., Benson St. and Bellevue Ave., Detroit, Mich.* [A. M. vol. 58, p. 599.]

The actions of the carriage and workholding parts, in connection with the grinding wheel, generate a true involute curve, although the curve can be varied so that



practically tooth contour and dimensions can be obtained. The machine is self contained. It is designed with a view to the elimination of vibration. The work is mounted on a carriage and caused to roll over the abrasive wheel as though on a rack tooth. Change gears are provided for grinding one side of a gear tooth at the rate of either 4, 5 or 6 sec. The carriage is controlled by an automatic stop mechanism. The roll of the work spindle is used for indexing the slotted steel disk which controls the spacing of the gear. Less than one second is needed to index a tooth. A worm-driven wheel truing device is provided. The wheelhead pad is equipped with an elevating mechanism, and the wheelhead can be swiveled either side of center to any angle up to 25 degrees.

— 30 —

Grinding Machine, Internal, Hydraulically Operated, No. 72. *Heald Machine Co., Worcester, Mass.* [A. M. vol. 58, p. 311.]

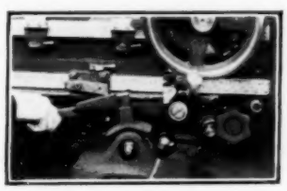
The machine is of the same capacity as the No. 70, but is equipped with the hydraulically operated table move-

ment and several other devices to increase the speed and accuracy. Except in the oil pump, there is no toothed gearing in the machine. The headstock is driven by belt from an overhead countershaft provided with five-step cone pulleys. The table movement is controlled entirely by two small levers on the front of the base, one controlling the direction and the other the speed. Table speeds from 2 in. per min. to 36 ft. per min. are obtainable. The point of automatic reversal is determined by adjustable dogs on the front of the table. The crossfeed of the wheelhead is equipped with automatic sizing features. A diamond truing device is provided. The workhead will swing 12 in. inside the water guards, and the machine will grind holes 11 in. deep. The workhead swivels 45 deg. either way. Floor space, 6½ x 3½ ft. Weight, 4,500 pounds.

— 31 —

Additions to Heald No. 72 Internal Grinding Machine. *Heald Machine Co., Worcester, Mass.* [A. M. vol. 58, p. 779.]

Several features have been added to the machine. The illustration shows the mechanism by which the operator may run the wheel slide

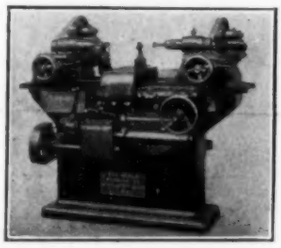


out of the way for gaging the work. To do this he merely lifts the hand lever at the left. The wheel slide will remain in the outer position until the operator tips the reversing lever by means of the ball handle. The crossfeed mechanism and sizing stop have been rearranged. A movement can be obtained corresponding to an increment of 0.0001 in. in diameter of the hole being ground. The water guard enclosing the chuck is overbalanced by a spring which holds it open unless it is held in the closed position by a catch. The diamond truing device is mounted upon a separate bridge and can be swung up out of the way of the wheel. When brought to its active position, the point of the diamond constitutes a sizing device, so that a hole cannot then be ground too large.

— 32 —

Grinding Machine, Internal, Double-Head, No. 70. *Heald Machine Co., Worcester, Mass.* [A. M. vol. 58, p. 352.]

This adaption of the No. 70 internal grinding machine is intended to carry two wheel heads and thus grind long holes at both ends simultaneously. One application is grinding the bores of cluster gears used in automobile transmissions. The machine has a long table with a wheel head at each end. The stationary work-head bridge is a special casting and is placed at the center of the machine. It is necessary to design a special work-head for each adaption, such as a Garrison chuck for holding cluster gears. Since both wheelheads are mounted on one table, one wheel enters the work at one end as the other

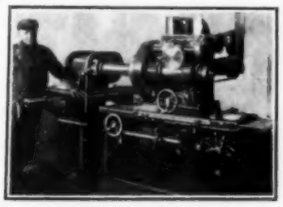


wheel is leaving the opposite end. Each wheel head is independently driven and has its individual cross feed and sizing mechanisms.

— 33 —

Grinding Machine, Cylinder, Internal. *Churchill Machine Tool Co., Ltd., Broadheath, Manchester, England.* [A. M., vol. 58, p. 637.]

This machine for grinding cylinders and holes in parts which cannot be rotated in the usual sizes of grinding machines is particularly adapted to locomotive and railroad work. It has a large table with cross adjustment only for positioning the work, the table remaining stationary during the actual grinding. The grinding wheel spindle is provided with a planetary motion adjustable while grinding is going on, and is carried in a head vertically adjustable on the column. The column is mounted on a slide having an automatic longitudinal movement on the bed and a range

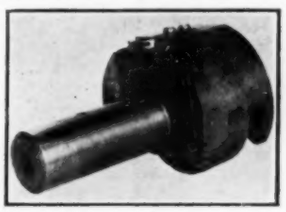


of speeds. The main spindle is provided with speed changes, and various sizes of wheel spindles can be attached to it. Work having a large number of holes can be ground without disturbing the setting on the table. It is claimed that with the machine a cylinder 8 in. in diameter and 12 in. long can be ground to a finish and have 0.02 in. of metal removed in 20 minutes.

— 34 —

Grinder, Internal, Portable, "Cyl-Grind." *Allan Manufacturing & Welding Co., Buffalo, N. Y.* [A. M., vol. 58, p. 855.]

While intended for the removal of excess metal and high spots on cylindrical sur-

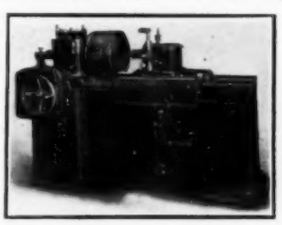


faces, the grinder may be used on flat surfaces as well. The wheel can be adjusted to suit the radius of the cylinder it is desired to finish. Two sizes are made. Type A is for automobile cylinder blocks and Type B for air, steam and water cylinders of the larger diameters. The former is for radii from 2½ in. to flat, has a wheel 2x1⅛ in. and requires a ¼-hp. motor. The latter is for radii from 4¼ in. to flat, has a wheel 4x1⅛ in. and requires a ½-hp. motor. Both types may be supplied with a motor and flexible shaft.

— 35 —

Grinding Machine, Internal, Automatic, "Teromatic." *Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.* [A. M., vol. 58, p. 928.]

The feature of the machine is the gaging mechanism, which is incorporated and correlated with the driving



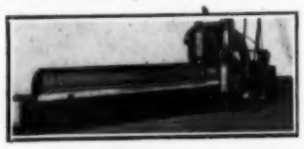
and feeding mechanism in such a way that the piece is automatically ground to the desired size before the machine stops. Holes from ¾ to 10 in. in diameter and up to 9 in. in length can be ground, the work being held by pressure between two plates. The swing is 15½ in. over the carriage and 14½ in. inside the water guard. The machine is motor-driven and equipped with push-button control. The carriage is reciprocated hydraulically, the pump being operated by a motor mounted on the back of the bed. The wheel spindle is driven by a separate motor mounted directly beneath it. The work is also operated by a motor. Ten roughing and ten finishing feeds are provided. Six speeds of rotation are provided for the work and six

traversing speeds for the carriage. Coolant is forced by a motor-driven pump through the center of the work spindle. The wheel dressing mechanism is located on the carriage. Floor space, 86x54 in. Weight, 3,900 pounds.

— 36 —

Grinding Machine, Surface, Planer-Type. *Reed-Prentice Co., Worcester, Mass.* [A. M., vol. 58, p. 200.]

The machine is for grinding long pieces hitherto beyond the capacity of this class of grinding machines. The bed, housings and table driving mechanism are of the standard Whitcomb-Blaisdell planer construction. The foundation plans include a

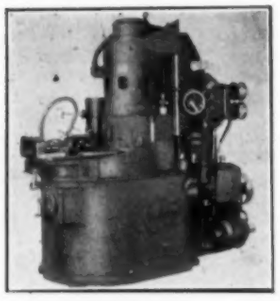


tank for the lubricant. Upon the housings is a special saddle to which is fitted a standard Blanchard motor-driven grinding head with a 20-in. wheel. The head is fitted to slide vertically on the saddle through a distance of 5½ in. Six specially built Simmons magnetic chucks are affixed to the surface of the table. The table is driven at a uniform speed of 28 ft. per min. in either direction, and the wheel grinds throughout the length of stroke in each direction. A pump supplies lubricant outside the wheel and through the hollow rotor of the head. The machine will grind pieces up to 15 ft. long, 19¾ in. wide and 10 in. high.

— 37 —

Grinding Machine, Surface, Automatic, No. 16-A. *Blanchard Machine Co., Cambridge, Mass.* [A. M., vol. 58, p. 349.]

The machine has the same capacity as the No. 16 plain machine. It is automatic in every respect and adapted especially to quantity production of small work, such as

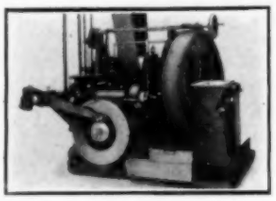


pipe wrench frames and roller and ball bearing races. The machine automatically grips the work, grinds it to size, measures it, controls the adjustment of the wheel-head, unloads, and demagnetizes the work, all without the operator's attention. The operation is continuous, the pieces are placed one after another on the chuck and form a continuous chain of work. When producing up to 1,200 surfaces per hour one operator only is necessary per machine. The rotating chuck or table is magnetic under the wheel and caliper only. The wheel-control caliper is of simple, sturdy construction. The wheel spindle is supported on ball bearings. The base forms a tank for 180 gal. of coolant.

— 38 —

Grinding Machine, Surface, Automatic, Osterholm. *Williams, White & Co., Moline, Ill.* [A. M., vol. 58, p. 925.]

The machine is adapted for production of such work as automotive parts. The wheel housing, in which is mounted the spindle carrying a 20-in. abrasive wheel, moves back and forward on guides on top of the base. A cam controls



the position of the 12¼ by 24 in. work table, and determines the velocity and amount of travel of the wheel housing toward the work. After chucking the work, all operations are carried through automatically, being controlled by the cam. The pump circulates water through the wheel spindle. The entire machine is supplied with positive oiling devices. The capacity is for pieces up to 10x40 in., and from 20 to 30 hp. are required. The stroke length can be varied from 2 to 24 in., while the time of the operating cycle varies from 10 sec. to 2 min. Floor space, 72x84 in. Weight, 7,000 pounds.

— 39 —

Sander and Grinder, Belt, Motor-Driven, Portable, Syracuse. *Porter-Cable Machine Co., Syracuse, N. Y.* [A. M., vol. 58, p. 355.]

This belt sander and grinder is for polishing and finishing parts requiring a straight grain finish and sharp edges. The machine equipped with proper abrasive belts, can be used as a surfacer on metal, wood, fiber and other materials. The 9x16-in. table is 36 in. above the floor, can be tilted 45 deg. down or 15 deg. up, and can be removed when the grinding bed is used in the horizontal position. The grinding bed, which is 10¼x25 in. in size, can be set at any position from horizontal to vertical. The abrasive belt runs at a constant speed on a 4-in. pulley driven at 3,600

r.p.m. All moving parts are provided with ball bearings. Maximum vertical height, 5 ft. 7 inches.

— 40 —

Grinder, Roller-Bearing. *Cleveland Armature Works, Inc., 4732 St. Clair Ave., Cleveland, Ohio.* [A. M., vol. 58, p. 170.]

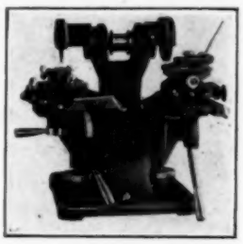
This direct-driven electric grinder is equipped with Timken tapered roller bearings. The motor has a high overload capacity, and motors for either a.c. or d.c. can be furnished for 1, 2, 3 or 5 hp. In the a.c. motor, both the rotor and stator are assembled and secured by means of electric welding. The control is by

means of a quick-acting switch operated by a hand e at the front. The wheel guards and the rests are adjustable and are clamped by means of handle nuts. Heavy plate-glass eyeshields can be secured to the front of the guards. The machines can be furnished in three styles of mountings, on a floor or bench pedestal or with a post bracket.

— 41 —

Regrinding Machine, Thread Chaser, H & G. *Eastern Machine Screw Corp., New Haven, Conn.* [A. M., vol. 58, p. 425.]

The machine is for regrinding the chasers of the H & G self-opening dieheads. It stands about 18 in. high and may be used on the bench or upon a pedestal. A spindle mounted on ball bearings carries a 4x¾ in. wheel at one end and a narrower wheel at the other. Upon each side of the column is fitted a vertically adjustable knee carrying a table. Upon one table is a fixture to hold the four chasers of a set, so that the rake angles can be ground. The fixture upon the other table is to hold a single chaser so presented to the narrow grinding wheel as to grind the throat. The tables are traversed by means

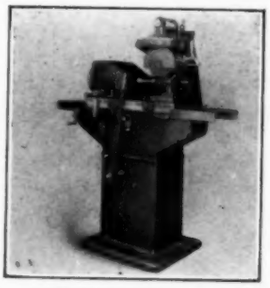


of hand levers at the front of the machine. Bench space, 20 in. square. Shipping weight with countershaft, 240 pounds.

— 42 —

Grinding Machine, Hob, Semi-Automatic, No. 5. *Harris Engineering Co., Bridgeport, Conn.* [A. M., vol. 58, p. 531.]

The machine is designed for sharpening hobs with both straight and right- and left-handed helical flutes, and not over 4 in. in diameter and 5 in. in length. The work-holding members are mounted on a table operated by means of a hand lever, so that the work can be moved back and forth across the face of the grinding wheel. The table travels on ball bearings. Hobs having helical flutes are automatically rotated. The indexing mechanism is semi-automatic and can be operated only at the end of the return stroke. A 7 in. diam-



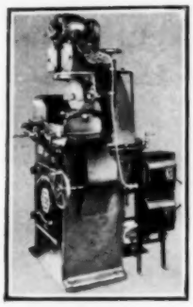
eter wheel is the maximum that can be used. The machine may be set to grind undercut hobs or cutters, and to give them top rake. The feed of the hob against the grinding wheel is rotative. Either countershaft or individual motor drive can be provided.

— 43 —

Grinding Machine, Hob, Automatic, Motor-Driven, No. 415. *Harris Engineering Co., Bridgeport, Conn.* [A. M., vol. 58, p. 674.]

A motor is mounted directly over the spindle of the grinding wheel. A diamond truing

device is attached to the wheel head, which swivels with the wheel when the latter is changed in its angular position. The table reverse, spiral generating, indexing and hob feed mechanisms are driven automatically by a

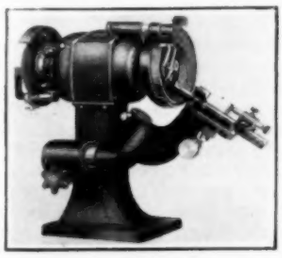


motor mounted at the rear of the base. The starting switches of both motors are of the enclosed type back of the machine. The machine grinds automatically straight fluted and either right- or left-hand helical fluted hobs, as the indexing and feeding are automatic. The rated capacity is for hobs 4 in. in diameter and 5 in. long.

— 44 —

Grinding Machine, Twist Drill, Motor-Driven, Bench, Grand Rapids. *Gallmeyer & Livingston Co., Grand Rapids, Mich.* [A. M., vol. 58, p. 676.]

The machine is equipped with a diamond truing device, which also automatically places the drill holder in the right relationship with the

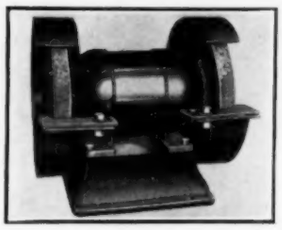


grinding wheel. The ½-hp. motor can be driven from a lighting circuit or power line. The A-7-T machine illustrated has a capacity for drills from No. 52 to ¾ in., and the B-7-T machine from ¼ to 1½ inches.

— 45 —

Grinder, Bench, Motor-Driven, Model 102. *Forbes & Myers, 172 Union St., Worcester, Mass.* [A. M., vol. 58, p. 678.]

Welded steel guards and tool rests are incorporated and are held to the motor frame by four nuts. A fully enclosed squirrel-cage motor is supplied, for voltages of 220, 440 and 550. The grinding wheels are 10x1 in. and run at a speed of 1,800 r.p.m. Wheels of different grades



and width can be supplied. The shaft runs on L-25 Norma ball bearings.

— 46 —

Grinder, Tool, Electric. *Efficiency Grinder Co., Madison, Wis.* [A. M., vol. 58, p. 748.]

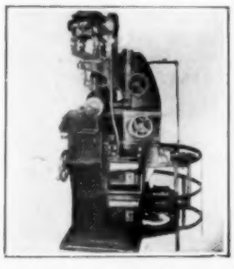
The machine is intended especially for grinding wood working tools. An attachment by which the tool can be held at the correct angle while being passed back and forth over the face of the

wheel is shown. The motor used is an a.c. Emerson ¼ hp. running at a speed of 1,750 r.p.m. It is attached to the rear of the machine and drives the spindle at 245 r.p.m. through a worm and wheel which run in oil. Both the roughing and the finishing wheel run in oil. The machine can be supplied with or without the pedestal. Floor space, 18x20 inches.

— 47 —

Grinding Machine, Hob, Full Automatic, Motor-Driven, Improved, No. 815. *Harris Engineering Co., Bridgeport, Conn.* [A. M., vol. 58, p. 822.]

An improved motor drive, together with a handwheel

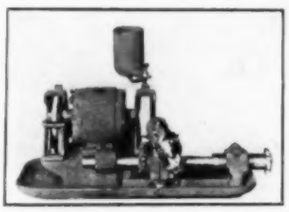


adjustment for both vertical and horizontal positioning of the grinding wheel has been installed on the machine. The entire wheel and motor unit may be swung to the required angle when grinding either right- or left-hand spirally fluted hobs. The motor is mounted on four square-headed screws which can be adjusted to take up belt slack. A motor is mounted at the rear of the machine to drive the table reverse, the index and the spiral generating mechanisms, as well as the pump. A separate switch box is furnished for each motor. Hand wheels provide sensitive adjustment of the wheel slide. The machine may also be furnished for belt drive.

— 48 —

Grinding Machine, Cutter, Engraver's Bench. *Reed-Prentice Co., Worcester, Mass.* [A. M., vol. 58, p. 955.]

The machine grinds small drills, milling cutters and engraver's tools to a predetermined angle. The motor regularly furnished is of ⅛ hp., 3,400 r.p.m., 110 volts, single-phase and 60 cycles. One wheel is used in connection with the universal head, and the other for free-hand grinding. The universal head consists of a bracket clamped on a swiveling bar. The base of the head is graduated and may be swiveled to any position. After a cutter has been clamped in the collet, the handle is used for rotating the spindle. An adjustable cam makes possible a longitudinal movement of the cutter spindle combined with the

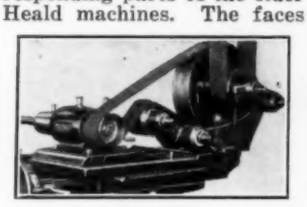


rotative movement, so that practically any amount of relief can be obtained. The cutter spindle receives the standard No. 2 Becker milling-machine collets, having a capacity ranging from ⅛ in. to ½ in. Bench space, 24x14 inches.

— 49 —

Belt Tightener and Countershaft, Internal Grinding Machine. *Heald Machine Co., Worcester, Mass.* [A. M., vol. 58, p. 275.]

This attachment is intended for delivering greater power to the wheel spindle, and can be interchanged with the corresponding parts of the older Heald machines. The faces

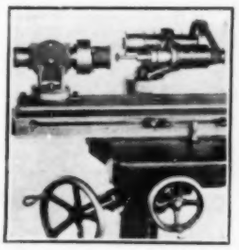


of the pulleys have been widened; the vertical belt from the countershaft is 3 in. wide and the belt from the large step to the spindle is 2½ in. A swinging idler or belt-tightener presses upward against the slack side of the belt under spring pressure. The wrap of the belt is much increased, and also the driving force. Small grooves in the faces of the pulleys allow the escape of trapped air.

— 50 —

Grinding Head, Internal, for Cutter Grinder. *Woods Engineering Co., Alliance, Ohio.* [A. M., vol. 58, p. 314.]

The head can be applied to the Woods Nos. 2 or 2½ universal tool and cutter grinder. The attachment is complete in itself and replaces the regular grinding head supplied with the machine. It is mounted directly on the column, and the change re-

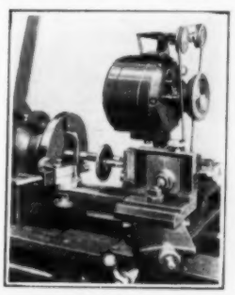


quires only about five minutes to make. The shaft driven from the overhead lineshaft is mounted on ball bearings. The spindle is mounted on four rows of ball bearings and has provision for adjustment. The spindle nose is arranged for mounting different lengths and diameters of stubs.

— 51 —

Grinding Attachment, Multi-Graduated, Improved, 1923 Model. *Precision & Thread Grinder Manufacturing Co., 1 South 21st St., Philadelphia, Pa.* [A. M., vol. 58, p. 387.]

The machine can be used on a variety of work, though particularly intended for



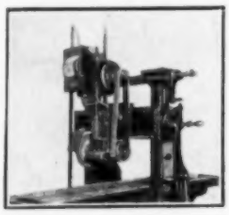
thread grinding on a lathe. The grinding spindle has been redesigned; it is heavier and the rear bearing is so constructed that should there be an elongation of the spindle due to an increased tem-

perature, the bearing may float. A ¼-hp., fully enclosed, ball-bearing motor is used. Other features are ball bearings in the idler pulleys, an improved index for setting the helix angle, and the oiling devices.

— 52 —

Grinding Attachment, Planer, Motor-Driven. C. L. *Hawes, 12 Adams St., Ashtabula, Ohio.* [A. M., vol. 58, p. 967.]

The device can be mounted directly on a planer. It is equipped with a 1½ hp., three-phase induction motor intended to be run at 3,600 r.p.m. The wheel spindle is 1 in. in diameter and is equipped with Timken roller bearings. The drive is through belt. The device is very compact, measuring but 30½ in. from the bottom of the bearing housing to the top of the motor base. The switch box, wheel and guard can be furnished to suit conditions.



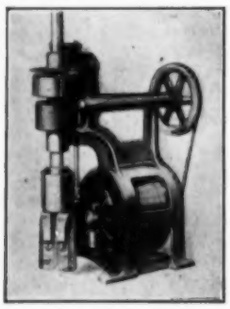
See Lathes, Special.

Honing and Lapping Machines

— 53 —

Refinishing Machines, Cylinder, Boring and Honing, "Stormizing," Models R, M and S. *Storm Manufacturing Co., 406 Sixth Ave. South, Minneapolis, Minn.* [A. M., vol. 58, p. 127.]

The machines are for refinishing the cylinders of automotive engines. The worn cylinder is trued up by a boring or reaming operation, and then by honing the surface is given a fine finish. The finishing head has a capacity from 2⅝ to 8 in. in diameter and is self-centering and automatic. It is shown in an electric-driven unit. The Model R heavy-duty machine has been equipped with a finishing spindle unit mounted in an inverted position. Its capacity is for diameters from 2⅝ to 12 in. and up to 20 in. deep. Either belt or motor-driven machines can be furnished. The Model M can be employed on its stand or can be removed and fitted to motor cylinders left in place in the automobile. The Model S portable machine is for work on cylinders while the motor block is in place in the car.



— 54 —

Lapping Machine, Automotive Cylinder. *R. M. Clough, Meriden, Conn.* [A. M., vol. 58, p. 462.]

The machine is used in conjunction with the hand reaming fixture furnished by the same maker. The fixture is for reaming the bore of any automotive engine having a removable head, without dismounting the engine from the car. The lapping machine is attached to the cylinder block and is driven by a ¼-hp. constant-speed electric motor. To the lower end of the spindle an expanding copper lap is attached by means of a floating connection. The spindle is rotated at 112 r.p.m. and reciprocated at 49 strokes per min. After the lapping has been completed upon a bore, a piston and rings may be substituted for the lap for running in.

— 55 —

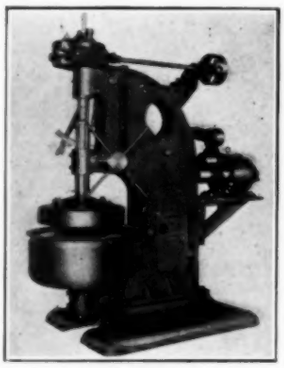
Lapping Machine, Vertical, Fraser. *Bethel-Player Co., Westboro, Mass.* [A. M., vol. 58, p. 888.]

The machine is for lapping piston pins and similar work that requires a high degree of accuracy and finish. The parts to be lapped are fitted on a spider and held between the surfaces of a stationary and a revolving lap, meanwhile being given an irregular motion that sweeps them over the entire surface of both laps, which are made of fine-grained cast iron. The work pieces have a combined rolling and sliding movement. The upper member is stationary, except for the vertical movement to lift it out of the way, and it is held by a floating connection. The lower lap is fastened to the upper end of the hollow vertical spindle. A speed of 60 r.p.m. is recommended. The capacity is for work pieces up to 1½ in. in diameter by 4 in. long. Floor space, 2½x5 ft. Weight, 2,000 pounds.

— 56 —

Lapping Machine, Vertical. *Bethel-Player Co., Westboro, Mass.* [A. M., vol. 58, p. 926.]

The machine laps round work, either parallel sided or tapered, up to 3 in. in diameter by 8 in. long. It is similar in principle to the Fraser lapping machine just described, but is of larger capacity and has the working parts inverted. The stationary lap is at the bottom, while the upper lap is revolved by a spindle, to which it is attached by a floating connection. Inside the spindle is a shaft by which a gyratory motion is imparted to the work. When the lap is lowered into contact with the work, the splash guard is automatically raised to enclose completely the revolving parts. The machine can be driven by belt or by individual motor. Floor space, 5x8 ft. Height, 7 ft. Weight, 6,800 pounds.



— 57 —

Lapping Machine, Ring, Vertical. *Bethel-Player Co., Westboro, Mass.* [A. M., vol. 58, p. 963.]

The machine is intended especially for lapping piston rings and similar work and resembles in general appearance the Fraser machine just described. Both laps are stationary and are made of a special grade of cast iron. The lower lap is supported on brackets extending from the base of the machine, while the upper one is suspended by a floating connection from the vertically adjustable upper spindle. The work carrier is a steel plate with cut-out openings of a diameter a trifle larger than that of the rings to be lapped. The lower spindle drives the work carrier to give it a movement that is a series of short circular sweeps combined with slow rotation. The upper lap is borne by the work at the commencement of the operation and gradually comes to rest upon the three-point bearing provided. The upper lap may be raised from the work for inspection or reloading. Floor space, 2½x5ft. Weight, 2,000 pounds.

— 58 —

Hone, Automotive Cylinder. *Auto-Hone Co., Inc., Buffalo, N. Y.* [A. M., vol. 58, p. 352.]

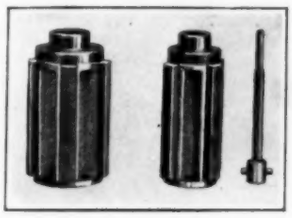
The hone is made in two sizes for cylinders from 2 13/16 to 4½ in. in size. It consists of a center arbor of aluminum carrying four honing stones. The stones are held in trays and their position is adjustable. Because of their length of 8 in. the stones bridge the area of wear and grind the full length of the cylinder wall. Spring pressure keeps the stones against the work. Two sets of stones are provided, one for quick cutting and the other for fine honing. The driving shank can be attached to an ordinary portable electric or pneumatic drill. In manufacturing processes the hones are held

on the spindles of multiple drilling machines, so that all the cylinders of an engine are finished at the same time.

— 59 —

Hone, Automotive Cylinder, Foster-Johnson. *Foster-Johnson Reamer Co., 1112 Beardsley Ave., Elkhart, Ind.* [A. M., vol. 58, p. 564.]

The tool is designed for repair shops as a finishing and polishing device for automotive cylinders which have been previously reamed to a size to fit oversize pistons. The body of the hone is made of aluminum. The smaller hones have four abrasive stones and the larger ones five stones. The stones are mounted in slots in which are set springs to provide adjustment and resiliency. The

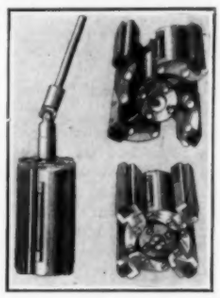


honing operation consists simply of the slow movement of the hone up and down while it is rotating within the cylinder. The hones are made in seven sizes whose minimum diameters range from 2⅞ to 4¼ in. Each size can be enlarged ¼ in. in diam.

— 60 —

Hone, Automotive Cylinder, Ammco, "Centrimatic." *Automotive Maintenance Machinery Co., 549 W. Washington Blvd., Chicago, Ill.* [A. M., vol. 58, p. 924.]

The tool is so constructed that the faces of the hones are all held at the same distance from the center of the



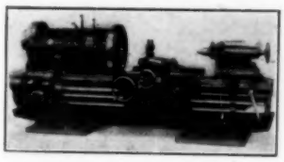
spindle. The tool is expanded by centrifugal force only. Each stone is mounted in a steel channel that forms a support for its entire length. The self-adjusting and self-centering features of the tool require no attention, as the operator needs only to watch the diameter of the bore. At the right side of the illustration the tool is shown expanded in the top and contracted in the bottom view. The range is from 2⅛ to 4 in. in diameter. A set of extension blocks is provided for use with cylinders from 4 to 5 in. in diameter, as shown at the bottom of the figure.

Lathes

— 61 —

Lathes, Geared-Head, Heavy-Duty, 25- and 27-Inch. *R. K. LeBlond Machine Tool Co., Madison and Edwards Rds., Cincinnati, Ohio.* [A. M., vol. 58, p. 90.]

The improved lathe is made in two sizes with lengths of bed required to suit the work. The headstock is of the selective-speed type and provides sixteen changes of spindle speed by the manipu-

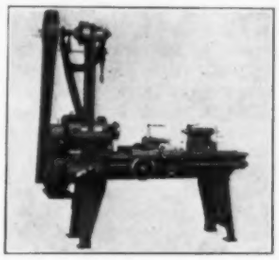


lation of two levers. The multiple-disk clutch is operated by a lever on the headstock and another on the carriage. The bed is of large depth, heavily braced, and the "compensating V" construction is employed for the ways. The speeds furnished range from 8 to 300 r.p.m. Both longitudinal and transverse feeds are engaged by means of a single positive jaw clutch. Forty-eight feeds are provided having a range from 0.003 to 0.184 in. per revolution, and the forty-eight threads range from 3 to 46 per inch. Motor drives can be furnished in three types, a belted motor drive, a constant-speed geared motor drive and a variable-speed geared motor drive. All standard attachments such as a taper attachment can be furnished. Weight of 25-in. lathe with 12-ft. bed, 10,000 lb.; 27-in. lathe, 10,520 pounds.

— 62 —

Lathe, Gap, Quick-Change, Motor-Driven, 16-Inch. *A. V. Carroll Machine Tool Co., Montgomery Rd., Norwood, Cincinnati, Ohio.* [A. M., vol. 58, p. 124.]

The lathe is intended for automotive and general repair work. The "invisible gap" allows a swing of 19 in., and by raising the headstock on special blocks a swing of 22 in. may be obtained without altering the gear box or intermediate gears. Either three- or four-step cones and single or double back-gears may be furnished. The carriage is fitted to receive a taper attachment. The machine has an interlocking

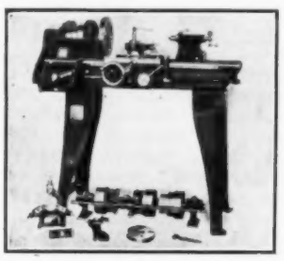


feeding device, and right- or left-hand feed arrangement. The quick-change gear box gives twenty-four feed changes by shifting one lever, and removable change gears can be used for any odd thread. The tailstock has the set-over feature and self discharging center. Bed lengths, 6, 8, 10 and 12 ft. Six-ft. lathe: 40 in. between centers; weight, 1,950 pounds.

— 63 —

Lathe, Gap, Quick-Change, 12 Inch. *A. V. Carrol Machine Tool Co., Montgomery Rd., Norwood, Cincinnati, Ohio.* [A. M. vol. 58, p. 125.]

The lathe is made for belt drive with a three-step cone and single back-gear. One gear-shifting lever gives twenty-four feed changes. The bed is so made with an "invisible gap" that chuck or faceplate work up to 14 in. in diameter may be turned. The headstock is of the bowl type with all gears covered. Raising blocks may be placed

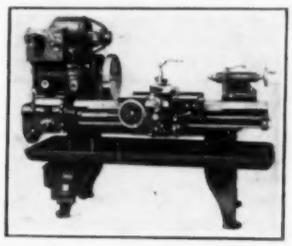


under it to give additional swing without altering the gear box and intermediate gears. The carriage has a thread indicator, and is arranged for a taper attachment. The reverse for right- or left-hand feeds is obtained from the apron. The compound rest has taper gibs throughout and a large graduated base. Three lengths of bed 3 ft. 8 in., 4 ft. 8 in. and 5 ft. 8 in. are regularly made.

— 64 —

Lathes, Heavy-Duty, 13- and 15-Inch. *R. K. LeBlond Machine Tool Co., Madison and Edwards Roads, Cincinnati, Ohio.* [A. M. vol. 58, p. 497.]

The lathe can be supplied with either a three-step cone head or with a single-pulley-drive geared head. It can be motor driven as shown, or by a motor mounted back of the legs, and it can be fitted with any of the standard types of rests, toolposts and attachments. The cone-head lathe is equipped with double friction back gears. The spindle nose is 2⅝ in. in diameter and has 5 U.S.S. threads per inch. Eighteen spindle speeds ranging from 16 to 375 r.p.m. are provided. The single-pulley-drive geared headstock provides nine changes of speed from 20 to 350 r.p.m. The bed of the machine has the "compensating V" construction which provides a bearing surface at right angles to the tool pressure and auto-



matically compensates for the wear of the carriage and the bed. Thirty-two feeds ranging from 12 to 184 are provided. Threads from 3 to 46 per inch can be cut. The 13-in. lathe has a swing of 15 in. over the shears, and the 15-in. lathe of 16¼. Tool sizes are ⅝x⅞ and ⅝x1 in. Shipping weights, 1,800 and 2,015 lb., respectively.

— 65 —

Lathe, Engine, Heavy-Duty, 14-Foot. *Niles-Bement-Pond Co., 111 Broadway, New York City, N. Y.* [A. M. vol. 58, p. 500.]

The lathe is for work on parts for large machines such as turbines and generators. It has a bed 11 ft. wide and 50 ft. long. Its faceplate is 12 ft. in diameter. It swings 14 ft. 6 in. over the bed and 11 ft. 6 in. over the carriage with

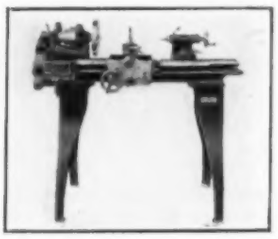
the removable track for the tool carriage in place. The maximum distance between centers is 34 ft. The driving gears in the headstock give the main spindle four quick mechanical changes of speed. The d.c. driving motor is of 50 hp. with a speed range of 500 to 1,500 r.p.m., and with the aid of the mechanical

speed changes drives the faceplate at from 0.23 to 24 r.p.m. A power traverse along the bed is provided for the tailstock. The tool carriage extends entirely across the bed. Lateral, cross and angular power and hand feeds are provided for the tool slides. An independent motor and controller mounted on the carriage are used for the rapid traverse of the carriage in either direction.

— 66 —

Lathe, Engine, 10-Inch. *Myers Machine Tool Corp., Columbia, Pa.* [A. M. vol. 58, p. 604.]

The gear box provides for cutting 25 threads from 6 to 52 per inch. The threads on the lead screw are employed only when thread cutting. A three-step cone pulley is used and the back-gears have a ratio of 7 to 1. A thread-

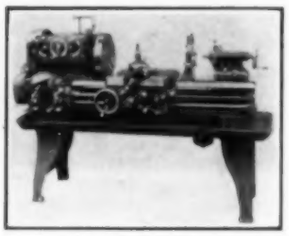


ing dial is provided. A number of attachments can be supplied. The lathe has a distance between centers of 24 in., a swing over the ways of 10½ in. and a swing over the compound rest of 6½ in. A No. 2 Morse taper is provided for the spindle and the tailstock. The machine can be furnished for use on either the floor or a bench. The floor type weighs 400 lb. and the bench type 360 lb.

— 67 —

Lathe, Engine, Geared-Head, Automatically Oiled, 12-Speed. *American Tool Works Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 815.]

The geared heads are made for all sizes of "American" lathes up to and including the 36-in. medium pattern lathe. All the gears in the

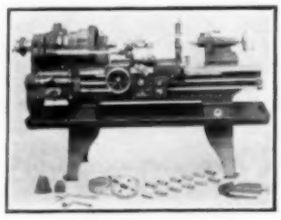


head are made from heat-treated manganese steel, and all speed change gears are hardened. Only three shafts are used in the head and consequently large diameter gears. The head is under control through either of two levers, one at the right side of apron, and the other at the left side of the head. The pulley is bronze bushed and mounted on a long steel sleeve which takes the belt pull from the driving shaft. A gear-tooth clutch is used on the high-speed drive in place of the jaw clutch. An automatic oiling system is employed to lubricate the head. It is stated that the lathe will accommodate a 20-hp. motor up to its full capacity.

— 68 —

Lathe, Engine, Toolroom, 15-Inch. *R. K. LeBlond Machine Tool Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 966.]

Either geared-head or cone-pulley drive machines can be supplied. The usual attachments are furnished to make the machine a complete toolroom lathe. A lever-operated or a handwheel type draw-in attachment can be supplied. Collets can be supplied in any size from ¼ to 1 in. A feature of the lathe is the universal relieving attachment. By the use of only two cams, any relief from zero to ¾ in. can be obtained, and it is possible to do external, cylindrical, internal, end and angular relief. For angular relief the attachment is swiveled

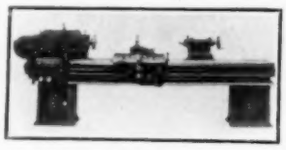


to the proper angle and the taper attachment is connected. Some specifications are: Swing; over shears, 16¼ in., over carriage, 11¼ in. Capacity between centers, with 6 ft. bed, 2 ft. 7 in. Spindle speeds, 9 from 20 to 350 r.p.m., or 18 from 15 to 350 r.p.m. Size of tools, ⅝x1 in. Feeds, 32 from 12 to 184. Threads, 22 from 3 to 46. Shipping weight with 6 ft. bed, 2,015 pounds.

— 69 —

Lathe, Engine, Geared-Head, 18-Inch. *Mueller Machine Tool Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 967.]

The machine has an apron control for 16 changes of spindle speed with forward or reverse motion. All changes are made without stopping the driving pulley. The long lever shown in front of the head controls four changes of speed from the main driving shaft, acting through friction clutches. The four changes are transmitted direct to the spindle with the back-gear pinion withdrawn from the spindle gear and with the sliding clutch gear on the spindle engaged. Triple back-gears are employed. All bearings are bronze bushed and self-oiling, and all jaw

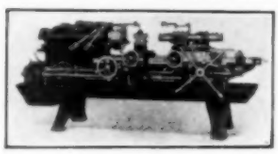


clutches are of nickel steel and hardened. The gears have a 20 deg. pressure angle and are of stub tooth form. The reversing attachment is a separate unit. A number of adjustable dogs on the front of the lathe bed trip the automatic feed at any desired position. The lathe can be furnished with motor drive.

— 70 —

Lathe, Turret, Flat, Universal, No. 2. *Acme Machine Tool Co., 4955 Spring Grove Ave., Cincinnati, Ohio.* [A. M. vol. 58, p. 50.]

The machine is adapted for either bar or chucking work, swinging chucked work up to 20¾ in. in diameter and taking bar work up to either 2½ or 3¼ in. in diameter. The all-geared head, single-pulley drive provides twelve spindle speeds from 18 to 318 r.p.m., changed by one continuous movement of one lever. The side carriage spans the ways of the bed. Power feed is provided in either direction for both side and main turrets, and longitudinal rapid traverse in either direction for the main turret. The side head has one adjustable stop and the main turret

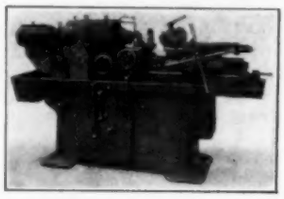


twelve longitudinal stops. A thread-chasing attachment is in the regular equipment, and a taper turning attachment for the side head can be furnished. A 5-hp. motor may be mounted on the rear of the head-end leg. Floor space, 3 ft. 9 in. x 10 ft. 8 in. Weight, 5,000 pounds.

— 71 —

Lathe, Turret, Motor-Driven, Selt-Contained. *Wood Turret Machine Co., 316 S. Alabama St., Brazil, Ind.* [A. M., vol. 58, p. 56.]

This self-contained lathe is mounted on a cabinet base, with the driving motor on the rear cover plate inside the cabinet. A silent chain connects the motor with the main drive shaft running through the center of the cabinet. A cone friction clutch of the full-floating type is incorporated in the drive, as well as a change-gear box with six changes of speed on the plain head machine. When a friction back-gear is used, twelve changes of speed are obtainable. A reverse is provided for every forward speed. In the drive from the gear box the pull of the belt is always down on the head-stock. All the controls are

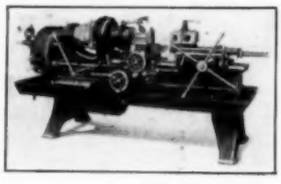


centralized in the operating position at the front. Either d.c. or a.c. motors of constant or variable speed can be employed. The machine may be driven by a belt as a single-pulley machine by mounting a jack shaft on the rear cover plate.

— 72 —

Lathe, Turret, Universal, No. 1. *Acme Machine Tool Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 126.]

The lathe is made in two models and has eleven tool stations for boring, facing, turning and forming. It is a high-production machine for the manufacture of parts from bar stock, castings or forgings. Two or more tools can be in operation at the same time. Both the main and cross-slide turrets have separately controlled feeds. One model of the lathe has a cone-pulley driven head, and the other a single-pulley driven all-geared head. The latter is of the sliding gear type, giving twelve changes of speed from 18 to 318 r.p.m. The longitudinal movement of the main or hexagonal turret carriage has six independent

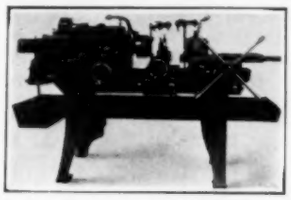


stops. The square turret can be indexed to four positions. Eight feeds may be given either turret carriage, varying from 13 to 333 revolutions of the spindle for each inch of carriage travel. The machine will take 1⅛ in. round, 1 1/16 in. square or 1 1/16 in. hexagonal stock. Work up to 9 in. in length and 18 in. in diameter can be machined.

— 73 —

Screw Machines, All-Geared-Head, Nos. 3, 5 and 7. *Foster Machine Co., Elkhart, Ind.* [A. M., vol. 58, p. 387.]

The three sizes, Nos. 3, 5 and 7, have capacities, respectively, of 1 5/16, 1 3/8 and 2 1/2 in. for round bars. The head mechanism is entirely geared and driven from a single pulley. The No. 3 machine shown

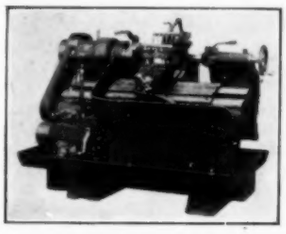


has eight spindle speed changes from 29 to 500 r.p.m. The total cross and longitudinal travels of the slides are, respectively, 8 1/4 and 10 in. The swing over the bed is 14 1/2 in. Six power cross feeds are available for the cross slide, ranging from 0.0027 to 0.025 in. On the Nos. 5 and 7 machines eight spindle speeds are also provided, ranging from 24 to 414 r.p.m. and from 20 to 333 r.p.m., respectively. The swings over the bed are 17 1/2 and 20 in. for these types. In general the specifications are identical with those of the friction head machines of similar size. Full equipment can be furnished.

— 74 —

Lathe, Multi-Cut, Semi-Automatic, No. 12. *R. K. LeBlond Machine Tool Co., Madison and Edwards Rds., Cincinnati, Ohio.* [A. M. vol. 58, p. 52.]

The machine is for simultaneously turning and facing such parts as gears and shafts, and is made in various bed lengths with center distances of 18, 26, 34 and 42 in. The maximum turning capacity is for work 12

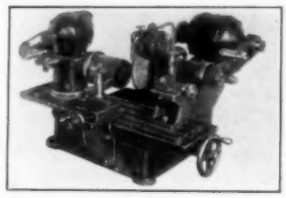


in. and the facing capacity 10 1/2 in. in diameter. The power rapid traverse for the turning carriage and facing slide automatically stops the spindle when the feed of the tool is stopped, and the submerged rotary pump is automatically shut off. The front shear, on which the turning carriage is mounted, is placed at an angle. The rear shear, on which the facing slide operates and on which the headstock and tailstock are mounted, is in a horizontal plane. The motion of the facing slide is derived from the profile plate on the rear of the bed. The machine can be driven from the lineshaft or by a 7 1/2 to 15-hp. a.c. or d.c. motor. The headstock spindle has six speed changes from 50 to 250 r.p.m. Feeds of turning carriage and facing slide 0.002 to 0.203 in. per spindle revolution.

— 75 —

Grinding and Turning Machine, Piston, Bench. *Franklin Machine & Tool Co., Springfield, Mass.* This concern has since been taken over by the *Van Norman Machine Tool Co., Springfield, Mass.* [A. M., vol. 58, p. 202.]

The machine is intended especially for turning and grinding automotive pistons, but may be used for general automotive repair shop work. Both tapered and parallel

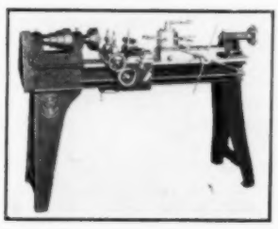


work may be performed, as well as boring and internal grinding. The work head at the left end of the table carries a 1/4-hp. motor. The spindle will hold faceplates, draw-in collets, piston adapters and lathe chucks. A tailstock that has a set-over for doing taper work can also be mounted on the bed. An arm or bracket on the front of the base carries a cross slide operated by a feed screw and fitted with a toolpost. The wheelhead consists of a 1/4-hp. motor driving a 10-in. wheel by belt.

— 76 —

Lathe, Metal and Wood, Combination. *Little Giant Co., Mankato, Minn.* [A. M., vol. 58, p. 607.]

By the use of both metal and wood working attachments many metal and wood working operations may be

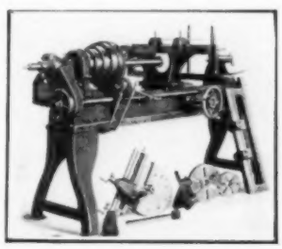


performed. The standard bed is 48 in. in length, making the greatest distance between centers 25 in. Eight spindle speeds are possible, ranging from 30 to 360 r.p.m. Both hand and automatic feed carriages can be provided. All combinations ranging from 1/48 to 1/8 in. are available. Attachments which make the machine adaptable for many metal-working operations are the turret, milling, gear cutting, thread cutting and grinding attachments. Other attachments include a band saw, saw table, jointer, planer, mortiser, sander and buffer for wood working operations. The floor space occupied by the lathe when on floor legs is 24x50 in.

— 77 —

Lathe and Cylinder Grinding Machine, Multi-Purpose. *S. K. Landis Co., Lancaster, Pa.* [A. M., vol. 58, p. 642.]

The machine is especially intended for small jobbing and automobile repair shops. It not only does the work of an engine lathe, but with the special attachments provided can perform the operations usually carried out on drilling and milling machines, shapers and turret lathes. The carriage for lathe work holds the combined compound rest and semi-circular turret. The grinding attachment is arranged so that a cylinder block may be ground with

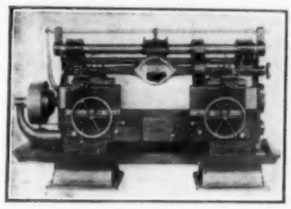


one setting. Cylinders up to 10 in. in diameter and 40 in. long can be ground without resetting, by using special equipment. A variety of attachments can be furnished. The lathe has a distance between centers of 52 in. and swings 18 in. over the ways. Floor space, 28 in. x 8 ft. Weight, 1,655 pounds.

— 78 —

Lathe, Turning, Double-End, Sundstrand. *Rockford Milling Machine Co., Rockford, Ill.* [A. M. vol. 58, p. 498.]

The lathe is built for such work as turning automobile axle shafts, rear axle housings, camshafts and similar parts which can advantageously be turned at both ends simultaneously. It is suitable for turning short pieces also, such as four-arm spiders and universal joint crosses. Two overhanging arms carry the tailstocks and also support the center drive mechanism. The center drive is through gearing from the main drive shaft. The feed shaft transmitting motion to the front carriages is driven from the center drive shaft by a sprocket and chain. Feed changes are made by means of removable change gears located at the end of the bed. When the feed is engaged the carriages work toward each other. The rear tool slides operate simultane-

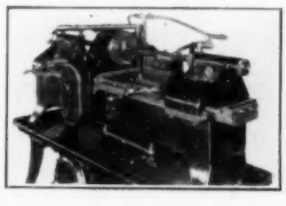


ously with the front carriages, but independent feeds are obtained by means of removable change gears. The lathes are furnished in two sizes, 36 and 60 in. The former occupies a floor space of 42x87 in., is 62 in. in height and weighs 5,100 lb. The latter occupies a floor space of 42x105 in., is 62 in. in height and weighs 5,500 pounds.

— 79 —

Lathe, Center-Drive, Double-End. *Porter-Cable Machine Co., 1708 N. Salina St., Syracuse, N. Y.* [A. M., vol. 58, p. 961.]

The machine is for turning axle shafts, camshafts and parts that can be turned at both ends simultaneously. The headstock, which is placed in the center of the bed, has a hardened and ground spindle 6 1/4 in. long with a 2 1/4-in. hole through it. The spindle is mounted on ball bearings and has a right-angle drive through worm gearing. The expanding clutch is arranged to stop the machine the instant that it is disengaged. A 3-hp. a.c. or d.c. electric motor, fastened to the underside of the oil

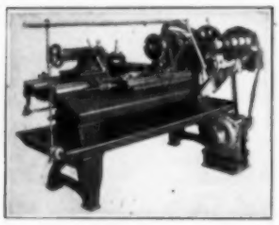


pan, furnishes the drive. The carriages are cam operated. and both straight and tapered work can be turned with them. The operator is relieved of movements other than loading and unloading the work and starting and stopping the machine. The tailstock at the right is foot operated. The machine can take work 32 in. between centers. Weight, 1,500 pounds.

— 80 —

Motor Drive, Cone-Head Lathe. *Hendey Machine Co., Torrington, Conn.* [A. M. vol. 58, p. 494.]

The drive mechanism, shown attached to a 16-in. lathe, is applicable to Hendey 12-, 14-, 16-, 18- and 20-in. lathes of both past and present designs. The countershaft unit is mounted on a base bracket clamped to the

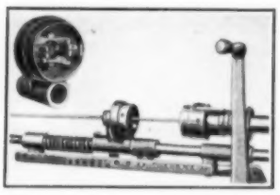


V of the lathe bed. The mechanism can be readily attached. It carries tight and loose pulleys that are belted to the motor, a completely enclosed reducing gear and a countershaft with a cone pulley. The countershaft can be moved toward or away from the lathe spindle, thereby either loosening or tightening the belt. The motor base is adjustable and provides a means of keeping the motor belt at the desired tension. A constant-speed a.c. or d.c. motor running at 1,200 r.p.m. is recommended.

— 81 —

Feeder, Bar-Stock, Continuous, Screw Machine. *Pearson-Scott Co., 1525 East Washington St., Indianapolis, Ind.* [A. M. vol. 58, p. 601.]

The device is for application to hand screw machines and is intended to eliminate the necessity for resetting

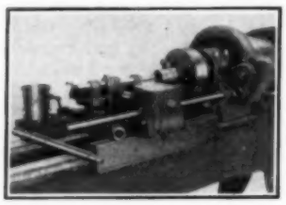


the collar or pusher on the hand-feeding mechanism. The gripping mechanism is shown at the top. In it are two bronze jaws, each carrying a tool-steel pawl. As the hand lever is pushed backward, the jaws release and slide on the bar; and as the lever is pulled forward, the jaws grip the stock and pull it along. The stock is held central between the pawls by means of two screws that can be adjusted to provide the necessary clearance.

— 82 —

Oil-Grooving Attachment, Engine Lathe. *Mueller Machine Tool Co., Cincinnati, Ohio.* [A. M. vol. 58, p. 714.]

The attachment will oil groove any diameter of work which can be made to revolve in the lathe on which the attachment is placed. Worm gearing transfers power to a splined shaft, at the end of which is an adjustable graduated cross bar that acts as a crank to move a crosshead for any stroke required from 1½ to 6 in. This crosshead carries the cutter bar, which is provided with a double-pointed cutting tool. The cutting tool cuts grooves forming single or double figures of eight without rechucking the piece. Taper holes or shafts are grooved

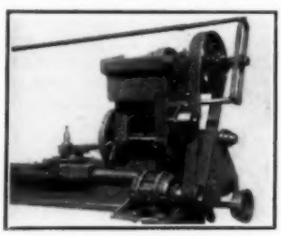


by swiveling the compound rest slide. A chain drive is regularly furnished. When attached to a Mueller lathe the driving shaft of the attachment enters the lathe head through the hole shown in the headstock casting.

— 83 —

Motor Drive, Cone Headstock Lathe. *John Steptoe Co., Cincinnati, Ohio.* [A. M. vol. 58, p. 749.]

This compact motor-drive arrangement is applicable to the "Standard" 14-, 16-, 18-, and 20-in. engine lathes. The arrangement can readily be attached, as very little machine work is required. The countershaft unit is bolted over the cone pulley of the lathe. The cone pulley on this countershaft can be moved away from the lathe spindle to tighten the belt connecting the cone pulleys. The belt from the motor to



the countershaft is kept tight by an idler pulley. A clutch pulley is mounted on the countershaft. A constant-speed motor of 1,100 to 1,200 r.p.m. is recommended.

See Woodworking Machines, Lathes.

See Threading Machines.

See Small Tools for Cutting Tools and Attachments.

Milling Machines

— 84 —

Milling Machine, Hand, Double-Spindle. *United States Machine Tool Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 389.]

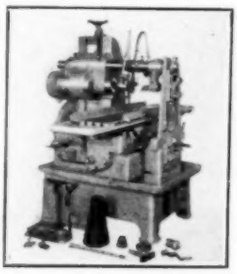
The machine is intended for milling the step slots in piston rings and for similar work such as opposite keyways in small shafts. The

feed movements are operated by hand only. The upper spindle is adjustable from the lower a distance of 1¼ in. to allow for wear of the cutters. The two spindles run in opposite directions. The machine requires 2 hp. The working surface of the table is 7x23 in. with a longitudinal movement of 6 in. by a crank. A 5-in. hand cross feed and 15¾-in. vertical feed are provided. Weight, 950 pounds.

— 85 —

Milling Machine, Manufacturing, Automatic, No. 33. *Brown & Sharpe Manufacturing Co., Providence, R. I.* [A. M. vol. 58, p. 602.]

This machine is for the automatic milling of duplicate parts in large quantities. The automatic control of the spindle and table is obtained

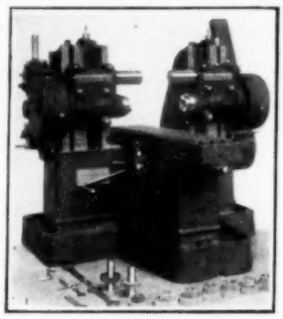


by means of dogs located at the front and rear of the table. The automatic action applies to the variable feed, constant fast travel and stopping of the table, as well as to the starting, stopping and reversing of the spindle. The movements are controlled independently. The machine is driven from a single pulley. Twelve changes of spindle speed are provided from 22 to 180 r.p.m. There are eighteen table feeds ranging from 0.38 to 24.54 in. per min. The table has an automatic longitudinal feed of 34 in. and a transverse adjustment of 5½ in. The spindle can be adjusted vertically 15 in. Provision is made for enclosing a constant-speed motor within the base for a motor drive. Automatic lubrication is provided for all operating parts within the frame. The working surface of the table is 52x12½ in. Weight, 6,200 pounds.

— 86 —

Milling Machine, Automatic, Worm-Driven, 48-Inch. *Cincinnati Milling Machine Co., Cincinnati, Ohio.* [A. M. vol. 58, p. 645.]

The machine is made in three types, the Duplex, Widened Duplex and Plain. The duplex machine, here illustrated, has two spindle driving units or headstocks mounted on the bed, one on each side of the table. It is especially adapted for machining parallel plain surfaces, using face mills. The widened duplex machine per-



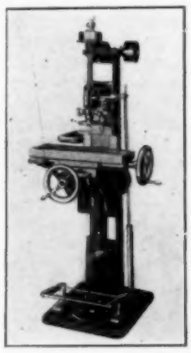
mits a greater distance between the spindle ends. The plain machine has but one headstock and an arbor support. The table is mounted directly on the bed. The headstocks may be adjusted by means of screws. The spindles are carried in brackets adjustable vertically. On the duplex machine one pulley drives both spindles. Power is transmitted through gears to the worm drives at the spindles. The table feed and quick return mechanisms are controlled by dogs. Sixteen feed changes are provided through quick change gears. The total working travel of the table is 48 in. and the working surface is 12x59 in. The duplex machine weighs about 8,500 pounds and the plain machine about 500 pounds less. Suitable fixtures and attachments can be furnished.

— 87 —

Milling Machine, Vertical, with High-Speed Attachment. *R. M. Clough, 327 Colony St., Meriden, Conn.* [A. M. vol. 58, p. 56.]

The machine is the same as the regular No. 1 machine,

except for the attachments. Handwheels are fitted on the table screw and cross screw instead of ball handles. A treadle controls the feed, and the stop gage for the spindle is placed on the sleeve above the head. The high-speed attachment is clamped on the lower end of the spindle

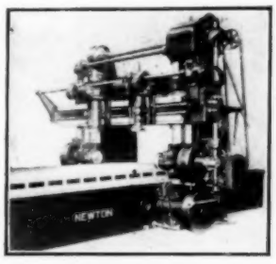


sleeve. It is driven by a round belt running in a V-groove pulley mounted on the spindle. The speed is four times the speed of the spindle of the machine, so that up to 10,000 r.p.m. can be obtained. The spindle has a draw-in rod, and a small watch chuck is used to hold milling cutters $\frac{1}{16}$ in. or smaller in diameter.

— 88 —

Milling Machine, Planer-Type, Heavy-Duty, "Multi-Miller," Newton. *Consolidated Machine Tool Corporation of America, 17 East 42nd St., New York, N. Y.* [A. M. vol. 58, p. 954.]

Duplicate sets of control levers permit the machine to be operated from either side

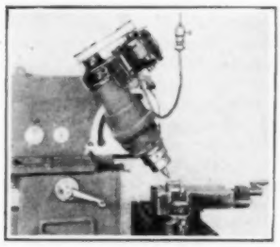


with equal facility. The bed is of one-piece box construction with closed top. The table is of double-plate construction, 8 in. thick over the ways and having a bearing 7 in. wide on each way. The power rapid traverse moves the table at the rate of 12 ft. per min. in either direction. The 18 table speeds are entirely independent of the spindle speeds and range from 1 to 33 in. per min. The box-section housings are reinforced at the top by an 18-in. tie-beam. The one-piece cross rail can be run either up or down by power rapid traverse at the rate of 3 ft. per min. Two vertical spindles and two horizontal spindles are supplied. They are driven by phosphor-bronze worm wheels. The feeds range from $\frac{1}{2}$ to $16\frac{1}{2}$ in. per min. The machine can be arranged for either belt or motor drive through a 12-speed gear box mounted on the right hand upright. It is built in several sizes.

— 89 —

High-Speed Attachment, "Duplex" Milling Machine. *Van Norman Machine Tool Co., Springfield, Mass.* [A.M. vol. 58, p. 356.]

High spindle speeds can be obtained for small milling cutters by the attachment of an auxiliary spindle to the "duplex" milling machine. The cutter spindle can be set to cut at any angle from vertical to horizontal. The attachment is adapted particularly to work which requires both light and heavy

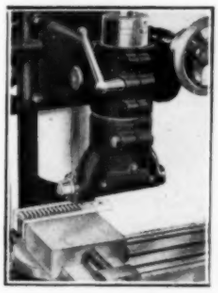


milling on the same piece, as the work need be clamped on the machine only once. It comprises a separate ball-bearing spindle within the main cutter spindle and is driven by a high-speed, ball-bearing motor adjustably mounted on and moveable with the main cutter head. It requires about five minutes to set up or take down the attachment. The high-speed spindle is adapted to carry No. 5 B & S taper-shank end milling cutters.

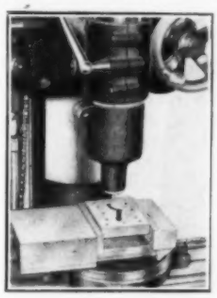
— 90 —

Milling Attachments; Horizontal, High-Speed and Slotting; Milling and Drilling Machine. *W. B. Knight Machinery Co., St. Louis, Mo.* [A.M. vol. 58, p. 958.]

The attachments are for use on the Knight Nos. 2



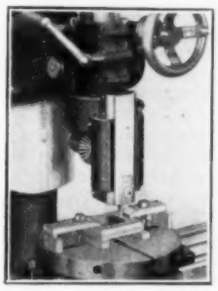
and 3 vertical milling and drilling machines. The horizontal milling attachment has a horizontal spindle which can be used in a plane parallel with the longitudinal movement of the table or in a position at a 90-deg. angle to this movement. In the first position the attachment is



used for such work as rack cutting. In the other position it can perform machining operations in the same manner as a horizontal milling machine. The spindle runs in two bronze bearings, one of which is tapered. Weight, approximately 30 pounds.

The high-speed vertical milling attachment is for work requiring the use of small cutters running at high speed, such as die-sinking and profiling. The device is slipped on over the nose of the spindle, and after the driving gears are meshed the housing is clamped to the stationary spindle sleeve. The drive is accomplished by means of an arbor which fits into the main spindle. The lower part of this arbor is an internal steel gear that drives by means of an idler gear, the small gear cut on the end of the high speed spindle. The high-speed spindle is provided with a No. 4 B & S tapered hole for holding standard $\frac{1}{4}$- to $\frac{7}{8}$-in. end mills. The spindle revolves at a speed $4\frac{1}{2}$ times the main spindle speed. Weight, approximately 16 pounds.

The slotting attachment is for use in tool and die making, and in such apparatus as forming square holes, cutting internal keyways and internal gears. It is clamped around the stationary spindle sleeve of the machine. A pair of steel bevel gears carry the drive from the arbor inserted in the spindle of the machine to the driving crank, on the end of which is a tool-steel bearing operating in the ram.



The ram has a 2-in. stroke. The toolholder takes a $\frac{3}{4}$-in. round tool and has a clapper box to give clearance for the return of the tool. Weight, 40 pounds.

See Threading Machines.

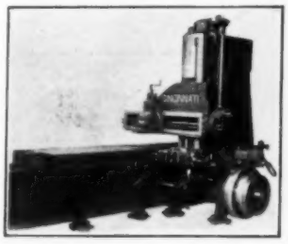
See Small Tools for Cutting Tools and Attachments.

Planers, Shapers and Slotters

— 91 —

Planer, Open-Side, 30x30-Inch. *Cincinnati Planer Co., 3820 South St., Oakley, Cincinnati, Ohio.* [A. M., vol. 58, p. 51.]

The table of the machine is gibbed on the right side and is so fitted between the two V's that it will not be twisted



out of its ways. An auxiliary work support can be provided. The bed is closed between the V's and made very heavy on the right side. Forced lubrication delivers oil into the V's of the bed directly under the tool point. The table is of very heavy box type with the bottom entirely closed. The T-slots are planed from the solid and stop holes are drilled and reamed throughout the entire surface. Herringbone gears are used for the first speed reduction; the large gears are semi-steel and the pinions steel forgings. The pulleys are aluminum. Work from 6 to 10 in. longer than the rated capacity may be planed. A special "tu-speed" countershaft is furnished and a variable-speed d.c. motor drive is recommended.

— 92 —

Planer, Crank, Open-Side, 26-Inch. *Whipp Machine Tool Co., Sidney, Ohio.* [A. M. vol. 58, p. 496.]

The machine has been redesigned and improved. It is fitted for work that requires either a planer or a shaper. The table is $46\frac{1}{2}$x $17\frac{1}{2}$ in. in size. The length of stroke of the table can be quickly adjusted by means of the crank mechanism. The

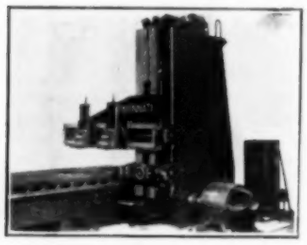
crank arm is mounted on a bearing pin at the bottom of the bed, the upper end and table adjusting nut being connected by heavy double links. The cross rail provides 25 in. traverse for the head. There are cross, verti-

cal and angular power feeds. Six changes of table speed are obtained by the use of quick change gears. The speeds vary from 7 to 70 table strokes per min. The feed control mechanism is like that used on planers. Horizontal feeds up to ⅜ in., vertical feeds up to ⅛ in., and angular power feeds are provided. Weight, 4,600 lb. net.

— 93 —

Planer, Open-Side, Motor-Driven, 72-Inch. *Cincinnati Planer Co., Cincinnati, Ohio.* [A. M. vol. 58, p. 957.]

One of the chief features is the gravity lubrication to the bearings in the bed. This system is in addition to the forced lubrication to the Vs. All oil is strained, settled and filtered several times before

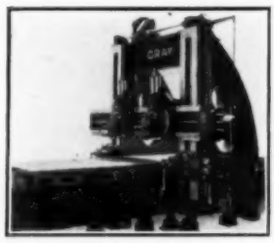


returning to the bearings. The bed is of box-type construction. Besides being bolted and doweled to the bed, the column fits on a large tongue cast integral with the bed. A box-type table is employed. A power elevating device raises and lowers the rail by means of screws mounted on ball bearings. Besides the feeds a rapid power traverse in all directions is provided for the heads. All control levers are within easy reach of the operator. The width of the table is 62 in., while the working dimensions are 72x 72 in.x12 ft. The drive is by a 35-hp. motor. A clamp prevents the table from lifting out of the Vs when the work overhangs.

— 94 —

Planer, "Maximum Service," 60- and 72-Inch. *G. A. Gray Co., Gest and Depot Sts., Cincinnati, Ohio.* [A. M. vol. 58, p. 964.]

The parts are built with heavy sections to insure rigidity under heavy cutting strain. Control is centralized at the right of the machine to eliminate much walking for the operator and to give speed of operation. To raise the rail the stirrup is pushed up. The rail stops without drifting, so that it may be set to a line. Each rail head is moved into position by simply shifting one lever at the end of the rail. Between the slide and harp on the rail head and between the saddle and the rail are "twin-purpose gibs." A turn of the

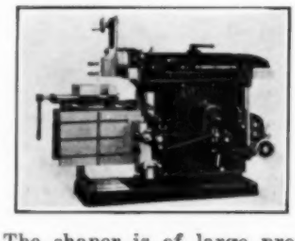


handle in one direction adjusts the gib to the operating position, while a turn in the other direction rigidly locks the parts. The standard "cantslip feed" is used. A turn of the wrist gives any feed from zero to 1 in. in steps of 0.01 in. All the gears, which are helical throughout, run in a bath of oil. Oil is pumped to all the drive-shaft bearings and to the Vs. Oiling and filtering are done automatically.

— 95 —

Shaper, Crank, 32-Inch, "Dreadnaught." *Ohio Machine Tool Co., Kenton, Ohio.* [A. M. vol. 58, p. 237.]

The machine has a stroke of 32 in. and can be arranged for either single-pulley belt drive or individual motor drive by an alternating or a direct current motor mounted at the rear of the machine.

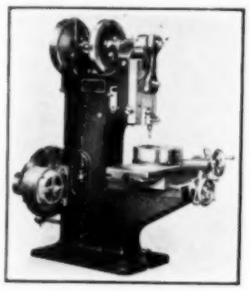


The shaper is of large proportions, to meet the requirements of plants where the work is particularly heavy. The bearing surface of the ram is rectangular and is 2½ in. high. The width of the ram is 13 in., while its length is 62 in. The control levers are all positioned on the operator's side of the machine. The shaper has a back-gear ratio of 28 to 1. The crank arm is 42½ in. long and the center of the bull-gear is located considerably above the center of the crank arm.

— 96 —

Slotter, Die, Motor-Driven, Bossert. *John Steptoe Co., 2961 Colerain Ave., Cincinnati, Ohio.* [A. M. vol. 58, p. 713.]

The slotter is made in two sizes, one having a maximum stroke of 4 in., and the other of 6 in., and it is intended especially for use in making round, square and irregular shaped punches and dies. The ram is driven by means of a crank, the length of the srtoke being variable by moving the crankpin on the disk. The ways are hinged on the upper end in such a way that they can be set at a slight angle to obtain clearance when finishing die openings. The lower end of the way may be connected to a toggle-joint mechanism to move the ram over a curved path on the down stroke. The ma-

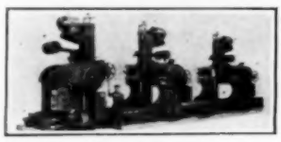


chine can be furnished with cross, longitudinal and circular hand feeds and also with power feeds. A variable-speed gear box gives three changes of speed. A circular table is regularly furnished.

— 97 —

Slotter, Locomotive Frame, Motor-Driven. *Niles-Bement-Pond Co., 111 Broadway, New York, N. Y.* [A. M., vol. 58, p. 818.]

The chief feature of the machine is the method used for the main drive of each unit. A reversing motor is mounted on each head, which motor, driving through one pair of gears only, rotates a vertical screw that directly engages the cutter bar. Motors of 20 hp. are employed, each with a 4-to-1 speed range. The cutting and return speeds are controlled independently, the desired cutting speed being set on one dial on the contactor panel and the return speed on the other. The motor is reversed by automatic contac-



tors governed by a pilot switch, which is actuated by the tripping of adjustable dogs on the cutter bar. The maximum stroke of the bar is 38 in. Each head has its own motor for feeding and traversing the head along the bed and the saddle along the crossrail. By means of change gears and swing arms, combinations of the longitudinal and the cross feeds may be effected, to slot any angle up to and including 145 deg. The slotter is built with from one to three heads and in any desired length of bed. The machine illustrated has a bed length of 60 ft. The openings in the yoke are 61 in. wide and 41 in. high, and accommodate six 6-in. frames or four 8-in. frames set on the bed for simultaneous slotting. The crossrail can be swiveled for cutting angles.

Presses

— 98 —

Press, Arbor, Screw, Hand, "High - Speed." *Weaver Manufacturing Co., Springfield, Ill.* [A. M., vol. 58, p. 124.]

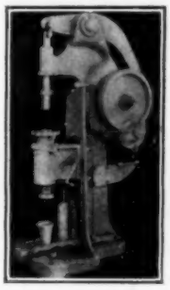
This hand-operated forcing press is for general use in garage repair shops and is equipped with a mechanism that enables it to be operated as a plain arbor press, as well as a screw press. In the former capacity, it is operated by a lever on the central housing. Both the handwheel and screw can be lowered 2 in. This mechanism is used for pressure under 2,000 lb., while for a greater pressure the screw can be employed. The ratchet lever is dropped into position on the handwheel, and pressure applied by pulling down on the lever.

The pressure can be built up to 60,000 lb., then instantly relieved by one reverse stroke of the lever.

— 99 —

Press, Arbor, Cam-Operated, Motor-Driven, Greenerd, No. 24. *Edwin E. Bartlett, Nashua, N. H.* [A. M., vol. 58, p. 494.]

The press is intended for manufacturing work, to take the place of a hand-operated press. A maximum movement of the ram of 5 in. is possible, obtained by means of a cam and rocker arm. The cam is operated by a quick-acting Horton type of clutch. The gear reduction is 45 to 1, from a ½-hp. motor and a complete cycle is made every 3 sec. The ram has a quick return. The knee is



adjustable as to height. The working table or abutment is yielding, its resistance to pressure being adjustable by a screw which compresses a helical spring. There is a 2½-in. opening through the abutment. The machine occupies a floor space of 24x42 in., is 73 in. in height, and weighs 1,575 pounds. The movement of the ram may be reduced by means of a collar, which prevents the complete return of the ram.

— 100 —

Press, Arbor, Rack and Screw, Hand, Kimkin. *Kimmerle Bros., 683 Golden Gate Ave., San Francisco, Calif.* [A. M., vol. 58, p. 532b.]

The press is applicable to gear, bushing and armature work that is done on a bench. The frame and base are cast integral. The arms of the frame are 16. in apart and

work up to 16 in. in. height can be pressed. A 10-in. hole is provided by removal of the surface plate. A speed ratio of 26 to 1 is obtained by using the rack and pinion; by using the screw the ratio is 980 to 1. The ram is 2 in. in diameter. Weight, 200 pounds.

— 101 —

Press, Arbor, Hand. *Little Giant Co., Mankato, Minn.* [A. M., vol. 58, p. 748.]

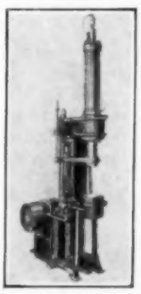
By the use of special attachments that are furnished many operations such as punching, shearing, straight-

ening, broaching and assembling may be performed. The machine is made in five sizes for work from 10 to 42 in. in diameter. Model A handles work 10 in. in diameter, has a travel of 9 in., weighs 140 lb. and occupies a space of 7x15 in. The base to which the press is shown attached is 33 in. high, weighs 100 lb., and occupies a floor space of 11x15 in. The leverage ratio is 40 to 1, so that one man can exert a pressure of 5 tons when the press is geared and 3 tons when not geared.

— 102 —

Press, Hydraulic, Broaching and Assembling, Vertical, Gooseneck. *Oilgear Co., Milwaukee, Wis.* [A. M., vol. 58, p. 532a.]

The machine is operated hydraulically and employs an Oilgear variable delivery pump. It is suitable for push

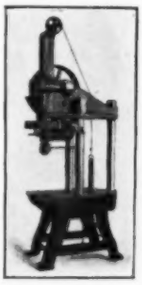


broaching and for such assembling as pushing in bushings. The ram speed and direction of travel can be controlled either automatically or manually at any point in the stroke. On production work, each new cycle is started manually by the operator and the rest of the action is automatic. The press is self-contained and requires no accumulator nor outside pressure system. The variable delivery pump should be driven by a 7½-hp. motor. The machine is built in four sizes: 3½, 6, 10 and 14 tons. Each size has a maximum stroke of 18 in., a throat depth of 8 in., a working height of 19¼ in., and an overall height of 7 ft. 2 in. The ram diameters vary from 2⅜ to 4¾ in. in the different machines, and the maximum ram speeds from 36 to 9 ft. downward and 90 to 23 ft. upward.

— 103 —

Press, Power, Flexible, 20-Ton. *General Manufacturing Co., Detroit, Mich.* [A. M., vol. 58, p. 531.]

The machine is flexible in its operation, being capable of pressures varying from a few pounds up to 20 tons. The head is mounted on three posts. The table is 22 in. wide and 30 in. from the floor. The ram is driven in one direction at a constant speed. The nut revolves with

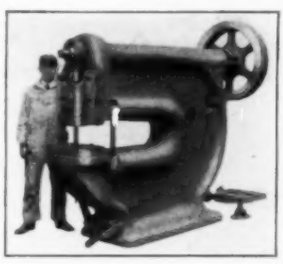


the ram until pressure is applied on a pedal. The pressure tightens the brake to stop the nut, and the ram passes down through the latter. The return stroke is obtained by means of a spring connected by a cable to the top of the ram. The maximum stroke of the ram is 12 in. and the greatest opening between the table and the ram is 18 inches. Floor space, 32x45 in. Height, 110 inches.

— 104 —

Press, Punching and Shearing, Deep-Throated, P-43. *Ferracute Machine Co., Bridgeton, N. J.* [A. M., vol. 58, p. 167.]

The machine is intended for punching and shearing bar metal. The distance from the center of the ram back to the frame is 42 in. The frame is of I-section and heavily reinforced. It is intended to withstand a pres-

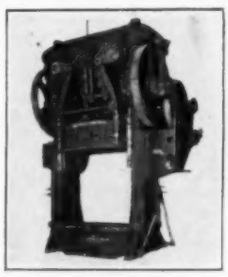


sure of 35 tons. It is capable of shearing flat iron or soft steel ⅜ by 5 in. in size, of punching a 1-in. hole in metal ⅞ in. thick, or of cutting off 1¼-in. round bars. The main shaft has bronze bearings, is 3¼ in. in diameter and is forged with a large solid collar on which the clutch mechanism is mounted and which serves as the brake wheel. The press has a stroke of 1½ in. and a ram adjustment of 3 in. Stay rods and a motor shelf can be furnished. The press is 35 in. wide, 48 in. long, and has a height of 83 in. Weight, 5,350 pounds.

— 105 —

Press, Drawing and Deep-Stamping, Double-Crank, Toggle. *Toledo Machine & Tool Co., 549 W. Washington St., Toledo, Ohio.* [A. M. vol. 58, p. 54.]

The press is made in a variety of sizes and is intended for all kinds of drawing, deep stamping and forming operations, particularly when forming such parts as metal automobile bodies and fenders. Its chief features are the smoothness of action, the exact timing that can be obtained, the dwell on the movement of the blank-holder slide, the high speed and the small floor space. Two trains of machine-cut gearing serve to drive the machine. The large twin gears at each end of the



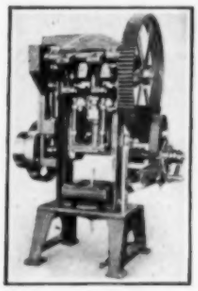
crankshaft operate the inner slide or drawing plunger. The outer or blank-holder slide is operated by cranks. When the toggle is straightened out the entire pressure on the work is held directly through the frame of the press and no power is required. A friction clutch enables the operator to start or stop the machine at any point of the stroke. A power elevator for the plunger slide is furnished, as is also a forced-feed lubricating system to oil all the main bearings from the floor.

— 106 —

Press, Drawing, Toggle. *J. M. Robinson Manufacturing Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 637.]

The improved blank holding mechanism is the feature of the press. The pressure is maintained constant during the full working period and tearing of the metal due to variation of the pressure

of the blank holder on it during the dwell is thus eliminated. The main frame is a one-piece casting. A friction clutch is regularly fitted. The press is made in six sizes, capable of punching holes from 6 to 16 in. in

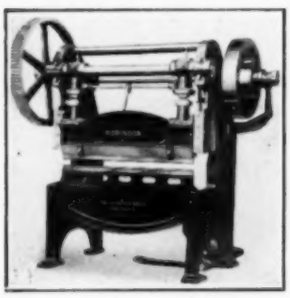


diameter, weighing from 5,700 to 35,000 lb., requiring from 3 to 10 hp. to drive and making from 34 to 10 strokes per min. The No. 205 press illustrated has a weight of 11,000 lb. and requires a 5-hp. motor.

— 107 —

Press, Brake, Forming, Gap. *J. M. Robinson Manufacturing Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 641.]

The press is suitable for plants manufacturing metal furniture or moldings. It can also be converted into a gang punch. The cast-iron main frames of the machine are made with a deep gap, so that long work can be handled. The cranks of the steel crankshaft are fitted

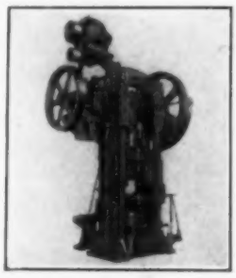


close against the main bearings. A friction clutch controls the press, in conjunction with a brake. The press is made in three sizes. An overall height of 8 ft. 1 in., a gap depth of 12½ in., and a gear ratio of 8 to 1 are provided for all three. The distances between the housings are 4 ft. 6 in., 5 ft. 6 in., and 6 ft. 6 in., while the weights are 6,600, 7,300 and 8,000 lb., respectively. The slide has a stroke of 3 in. and an adjustment of 2 in. for all types.

— 108 —

Press, Hot Forging, Straight-Sided, No. 512. *Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.* [A. M., vol. 58, p. 493.]

The machine is a single-crank press of steel-tied frame construction and is modified for hot forging work. A double-disk friction clutch and double back-gears are provided. There is an automatic dial feed of the ratchet type. The dial has an unusually long period of rest to make deep forming operations possible and to give the heated blank the necessary time under the pressure of the dies. The blank adheres to the punch as the latter rises, but is stripped off automatically, and a sweep swings out to direct the fall of the forging to the rear of the press. A relief mechanism is provided in case of

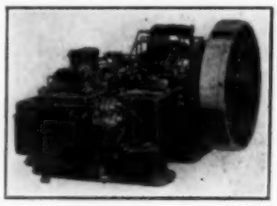


overload. It consists of a hydraulic cylinder and plunger under the bed and is fed by water pressure. If a cold blank should be fed into the die, the bolster is thus depressed due to the overload. When the pressure is relieved, the bolster rises in time for the next stroke, so that there is no delay in the work.

— 109 —

Heading Machine, Bolt and Rivet, Semi-Hot, Automatic-Feed, 1-Inch. *National Machinery Co., Tiffin, Ohio.* [A. M., vol. 58, p. 354.]

The machine has been designed so as to increase the strength of the bed frame over that of the former model; to perfect the gripping mechanism; to prevent premature wear and breaking down due to small size of working parts; to eliminate wasted time in the alignment of the grip dies with the heading tool; and to provide a means for adjusting the gripping or holding time of the machine. The steel bed frame

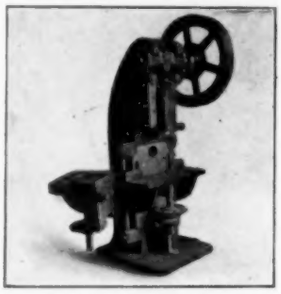


is only half as long as in previous designs. The shearing cut is made at an angle to prevent distortion. To assist in the control of the stock, a bender or straightening device is supplied. An automatic tripping device is provided on the feeding rod, so that, in case of a "sticker" in the gripping dies, the rolls are automatically raised. Weight, 31,500 pounds.

— 110 —

Press, Horning and Wiring, Two-Bed, No. 25. *Adriance Machine Works, Inc., 80 Richards St., Brooklyn, N. Y.* [A. M., vol. 58, p. 315.]

The arrangement facilitates press work where two sets of dies are required for the work. There are two adjustable swinging beds. One set of dies can be swung out of the way while the other is in use, although it is conveniently available when it is required. The height of each bed can be adjusted by means of the screw. The press itself is adaptable to a variety of operations such as cutting, blanking and forming. The No. 25 machine can handle



diameters up to 14 in. and depths up to 17 in. The plain machine has a floor space of 48x39 in. and a weight of 5,100 pounds.

— 111 —

Die, Hammer, Rocking-Face. *Beaudry & Co., Inc., 45 Bromfield St., Boston, Mass.* [A. M., vol. 58, p. 89.]

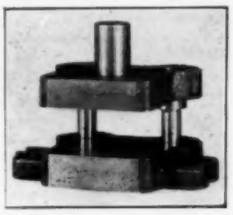
The die is for use on power hammers for drawing tapers and can be furnished to fit any make or size of trip, air or steam hammer. One end

of the die has a tilting face. The operator adjusts the position or angle of the work and strikes a light blow to adjust the tilting face to the angular position. Heavy blows can then be struck to form the taper. Any tapered form can be completely finished and smoothed up without hand finishing.

— 112 —

Die-Sets, Punch Press, Standard, Style B. *Danly Machine Specialties Co., 1613 N. Lincoln St., Chicago, Ill.* [A. M., vol. 58, p. 93.]

The standard die-sets are made in sizes to fit standard makes of presses. They are ready for the die layout, and are suitable for holding dies of practically all types. The die-sets are made in four types, covering a large range of sizes. All are equipped

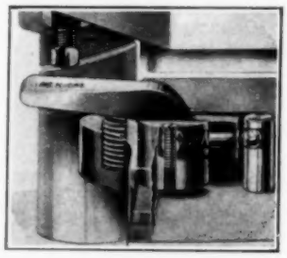


with leader pins to insure perfect alignment between the punch and die. Leader pins and bushings are hardened and ground to within 0.0002 in. of the listed sizes, and the bushings are lapped. All parts are interchangeable with those of sets of the same size and type.

— 113 —

Gage and Stop for Die-Sets. *Danly Machine Specialties Co., 1613 N. Lincoln St., Chicago, Ill.* [A. M., vol. 58, p. 496.]

This work gage and stop device is applicable to almost any type of blanking die. The device is a self-contained unit



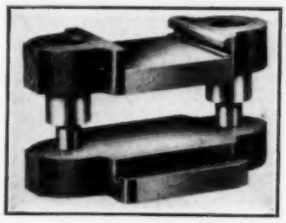
that can be attached to either a simple, progressive or compound die. To attach the stop to the die, it is merely necessary to drill three holes and cut a groove connecting two of them. The assembly of the stop in a stripper plate is done by fitting two small screws.

— 114 —

Die-Set, Punch Press, Type-Z. *Danly Machine Specialties Co., 1613 N. Lincoln St., Chicago, Ill.* [A. M., vol. 58, p. 603.]

The device is intended especially for punch presses used by adding machine and typewriter companies and other manufacturers requiring stampings of accuracy. The die-set has a "floating" punch shank. Hardened, ground and lapped bushings which never leave the leader pins guide the punch. The

adapters, which take the place of the punch shank, can be made up for either solid swivel, spring knock-out or positive knock-out. They



need not be removed from the ram when changing dies. A range of sizes is obtainable to accommodate dies from 4 to 10 in. square.

— 115 —

Feeding Device, Dial, for Punch Press. *S & S Machine Works,* 4522 *Lexington St., Chicago, Ill.* [A. M. vol. 58, p. 50.]

The feeding mechanism can be applied to any make and size of open-back inclinable punch press, and is useful especially in the manufacture of electrical goods. The parts being worked upon are carried under the punch to receive second or third operations. Two or three consecutive operations can be performed with only one handling. The dial feeds are built in seven sizes to suit various sizes of machines. The radial and thrust bearing in the center of the dial plate has a special mounting to

provide accuracy of feed and durability. The adjustable friction brake can be set to give the minimum amount of friction needed to bring the dial to rest.

— 116 —

Guard, Safety, Punch Press, "D & M Junior." *Taylor-Shantz Co.,* 478 *St. Paul St., Rochester, N. Y.* [A. M., vol. 58, p. 495.]

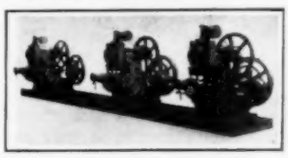
The device is for the protection of the press operator.

It is of simple construction having only nine parts. The guarding arm of the safety device is automatically driven by the ram of the press. It sweeps across the bolster of of the press and passes the dies before they close. Adjustments of the guard can be easily and quickly made. No changes are required in the press to which the guard is attached, and practically any size of press can be fitted with it.

— 117 —

Group Mounting, Punch Press, Combination. *Cleveland Punch & Shear Works Co., Cleveland, Ohio.* [A. M., vol. 58, p. 777.]

The mounting is intended for presses punching steel angles such as used in oil derricks and roof trusses which have groups of holes at each end and at the center. Air cylinders are used to hold the angles firmly against the gage blocks in a straightened condition. An end gage is furnished. The machines punch angles up to 26 ft. in length. One end machine is stationary, while the other two are adjustable along the base by hand. Each machine has punch attachments which

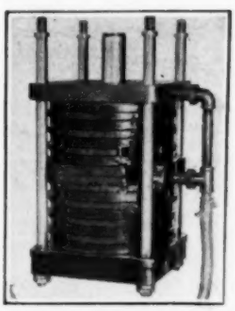


are adjustable to permit distances of from 2 to 20 in. between them. The machines may be operated individually, or all three simultaneously from either end. The mounting can be provided for machines of various capacities.

— 118 —

Cushions, Die, Pneumatic, Punch Press. *Marquette Tool & Manufacturing Co., Chicago, Ill.* [A. M., vol. 58, p. 778.]

These cushions produce a uniform pressure on the blank regardless of the unevenness



of the blank or the thickening of the metal during the operation. The sizes range from cushions having a piston 6 in. in diameter suitable for drawing shells to a depth of 2 in., to cushions which have a piston 25 in. in diameter for presses drawing shells to a depth of 8 in. The cushions may be applied to a press singly or in batteries. Both single- and double-acting cushions may be furnished, with two methods of operation for each. In one method, the piston remains stationary, while the cylinder rises vertically and applies pressure to the drawing ring. In the other method, the cylinder remains stationary and the piston is forced upward. The cushions may be utilized in making double-acting presses serve as triple-acting.

— 119 —

Spacing Table, Hand, Punch Press, 40-Foot. *Cleveland Punch & Shear Works Co., Cleveland, Ohio.* [A. M., vol. 58, p. 782.]

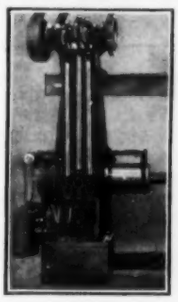
The table may be used with practically any open-gap single punching machine or regular I-beam type machine. It is of the open-side single-

rail type and permits of loading and unloading directly from the front. The movable rail is guided between rollers located on the stationary tie rails and is fitted with clamps to hold the work. A 36-in. handwheel propels by means of a rack and pinion the movable rail. The material supporting rollers are raised and lowered individually by means of a crank. The stopping of the table may be accomplished by either adjustable steel stops, hardwood pins or notched wooden templets. At each stop a hole is punched in the work. The table will handle a 24-in. I-beam with the material supporting rollers in their lowest position.

— 120 —

Pump, Hydraulic, High-Pressure, Vertical, Class SS. *Hydraulic Press Manufacturing Co., Mount Gilead, Ohio.* [A. M., vol. 58, p. 968.]

The pumping unit is for a hydraulic wheel press or tire forcing press and is intended for long service. A one-piece steel forging with renewable



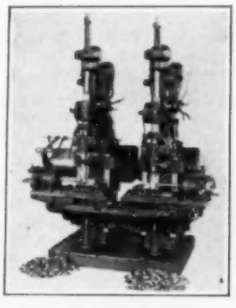
bronze seats screwed in for valves, forms the cylinder block. Secured to the cylinder block is a one-piece crosshead guide with babbitted bearings. An adjustable spring-loaded safety valve is provided. The pump is furnished in either two- or three-plunger types, the latter being provided with one low- and two high-pressure plungers. Both types are provided with automatic knock-out valves of the spring-loaded type. The eccentric shaft is located a considerable distance from the crossheads to reduce angular thrust in the crossheads. Either direct-connected motor drive or belt drive can be provided. The pump is made in three sizes from 7½ to 15 horsepower.

Threading Machines

— 121 —

Drilling and Tapping Machine, Gang. *Barnes Drill Co.,* 814 *Chestnut St., Rockford, Ill.* [A. M., vol. 58, p. 204.]

This gang drilling machine is fitted for production work when tapping small parts such as spuds for steel barrels. Each spindle of the machine is provided with a two-spindle auxiliary drilling head and carries two Rickert-Shafer collapsing taps of 2-in. pipe size. A geared thread leading feed corresponds to the pitch of the taps used. Coil springs on the spindles automatically return them upon the tripping of the taps, and the chasers are reset on the upward thrust of the spindle. On the table of the machine are two air-operated two-position jigs. The machine is provided with all-geared driving and feeding mechanisms, and has self-oiling features. Each unit of the machine is independent and is equipped with eight changes of speed and ten



changes of feed. It will handle twist drills from ¼ to 2 in. in diameter at suitable speeds and feeds. It is stated that the unit when attended by one operator can produce 700 pieces per hour.

— 122 —

Tapping Machine, Semi-Automatic, Three-Way. *Fox Machine Co., Jackson, Mich.* [A. M., vol. 58, p. 853.]

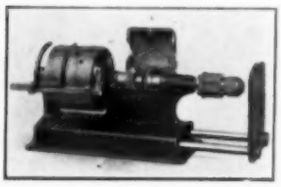
The machine has two side heads that tap holes in the ends of an automotive cylinder block, and a rear head that taps the holes in the side of the block. One 10 hp.

motor located on a base behind the rear head drives all three heads. By means of the lever on the front of the bed, the motions of all the heads can be started, stopped and reversed simultaneously. The heads advance at the same rate as the taps feed in the work. The reversing is automatic. The tapping speed is about 20 ft. per min., obtained by change gears. All the spindles are mounted on Fox cluster plates. Weight 6,350 pounds.

— 123 —

Tapping Machine, Bench, Horizontal. *William L. Procunier, 18 South Clinton St., Chicago, Ill.* [A. M., vol. 58, p. 855.]

The clutch is of the ring type that engages instantly when the machine is reversed. It can be easily replaced when worn out. A hardened steel "double-jaw" chuck provides the gripping mechanism. The tap is gripped on the

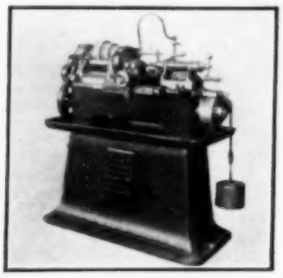


squared end with one pair of jaws, and on the round shank with the other. Should the tap hit the bottom of the hole, the safety friction members slip and prevent breakage. The machine can be furnished in four sizes having jaw capacities up to ¾ in., and with or without the safety friction attachment.

— 124 —

Threading Lathe, Generating, Automatic. *Automatic Machine Co., 113 East Washington Ave., Bridgeport, Conn.* [A. M., vol. 58, p. 960.]

The machine is for cutting small screws and nuts of coarse pitch, either single or multiple threads, worms and helical gears. To obviate the necessity for reversing the direction of rotation of the machine at each pass of the tools, a cam is employed instead of a master screw. The pitch of the thread being cut is not dependent upon the amount or rate of rise of the cam, but upon the relative rotative speeds of cam and work. The forward and back movement of the cross slide is actuated by a single-throw crankshaft. The feeding movement of the tools takes place automatically during the return stroke of the carriage and is actuated by a spring. The threading tools are of the "duplex" type; one tool cuts one side and a part of the bottom of one thread while the other tool cuts the other side and remaining part

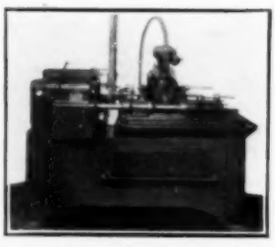


of the bottom of the same thread. The machine may be built of any required size. It is mounted on a cabinet pedestal in which is contaned the tank for the supply of cutting compound.

— 125 —

Thread Generator. *Fellows Gear Shaper Co., Springfield, Vt.* [A. M., vol. 58, p. 923.]

The machine operates on the molding-generating principle, and uses a helical cutter such as is employed on a gear shaper. The work rotates on an axis at right angles to the axis of the cutter. The cutter rotates in harmony with the work, as the two are geared together. The cutter is carried in a head retained in a slide that is traversed longitudinally. As the cutter is rolled in mesh with the work, it pro-

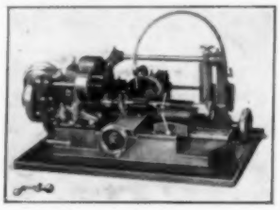


duces the thread. Change gears and the differential mechanism take care of rotation of the cutter with relation to the translating motion. The maximum capacities of the No. 1 machine shown are: A length of thread of 12 in., a center distance of 18 in., a pitch of ⅜ linear or 5 diametral, a helix angle of 23 deg., a pressure angle of 14½ deg. and an outside diameter of 23 inches.

— 126 —

Milling Machine, Thread, Relieving, Bench. *Waltham Machine Works, Waltham, Mass.* [A. M., vol. 58, p. 94.]

The machine has been adapted to relieving work on taps, hobs and milling cutters. The compound taper attachment is arranged to travel forward and back, actuated

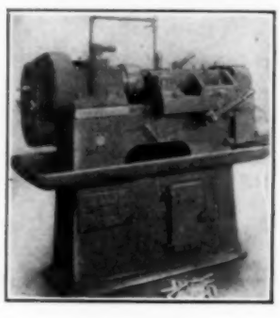


by a cam through levers adjustable for the amount of relief. The device can be set to mill concentrically, or with the ordinary relief, or with a combination of both. By means of a special driving mechanism, the relieving attachment may be operated on different numbers of flutes. Two starting levers are provided, one for relieving and the other for ordinary threading work. Work having either straight or helical flutes can be relieved, and multiple as well as single threads can be machined. For multiple cutter work the gear connection may be disengaged and an indexing device used for spacing the cuts. The movements are automatically operated.

— 127 —

Hobbing Machine, Thread, Duplex, Coulter. *Automatic Machine Co., 113 East Washington Ave., Bridgeport, Conn.* [A. M., vol. 58, p. 952.]

The machine was designed primarily for hobbing threads upon the jaws of pipe wrenches, where the cutting is done upon opposite sides of a bar to form an interrupted thread. The work is supported and driven at one end by a two-jawed, lever-operated chuck. The outer end of the work is centered in the usual way by a tail center. The two hob spindles are supported by the carriage and move lengthwise of the machine with it. One hob lies before and the other behind the center line of the machine,

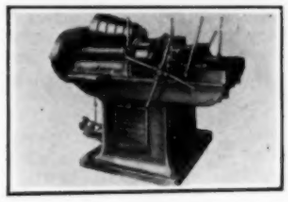


and their carriers are capable of adjustment for different sizes of work. The rotation of the work spindle is comparatively slow, as it is only the feeding movement of the work to the cutters. A work piece is completed at each cycle, which corresponds to each half-revolution of the work spindle, and the machine automatically goes out of action. The operator replaces the finished piece with a blank and again starts the machine. Floor space, 5½ x 2½ ft. Shipping weight, 5,000 pounds.

— 128 —

Threading Machine, Pipe and Nipple, Internally Tripped Die-Head. *Landis Machine Co., Waynesboro, Pa.* [A. M., vol. 58, p. 958.]

The feature of the improved machine is the internally tripped die-head, which automatically insures a uniform length of thread on the nipples and also elim-



inates the necessity of gaging them by hand. The machine threads, reams and chamfers pipes and nipples. The head can be set to open automatically when the thread has been cut to the desired length. It employs the Landis high-speed steel chasers and chamfering reamers. The machine is made in ½, 1¼, 2 and 4 in. sizes and may be furnished in both single- and double-spindle types.

— 129 —

Tapping Device, Sensitive, High-Speed, Jarvis. *Geometric Tool Co., New Haven, Conn.* [A. M., vol. 58, p. 532a.]

The device is intended for light work using high speeds. The body of the device is of

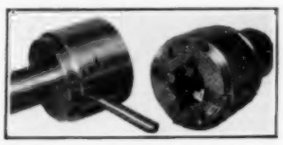
aluminum and weighs a little less than 2 lb. To prevent the breaking of taps at the instant of reversal, the machine is fitted with a shock absorber which acts on the reverse gears to decrease the

shock of reversal. The device is made in two styles. Style OA has a positive ball drive and is intended for use when tapping through the piece. Style OAN has a cone friction drive with ball reverse and is for work in blind holes. Their capacities are $\frac{5}{16}$ in. or smaller.

— 130 —

Die - Heads, Self - Opening, Hardened, "Namco." *National Acme Co., Cleveland, Ohio.* [A. M., vol. 58, p. 608.]

The heads are made in both the non-revolving type, shown at the left, and the revolving type, shown at the right. The non-revolving type is used on hand screw machines and turret lathes where the threading tool is not revolved. Seven sizes are available, with capacities for straight

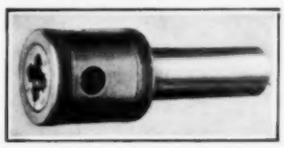


threads ranging from $\frac{1}{16}$ to 3 in. The revolving type opens and closes automatically while running. It is used on automatic screw machines and where the die revolves. Five sizes are available with a capacity for straight threads from $\frac{1}{16}$ to $2\frac{1}{2}$ in. The body and shank are made in one piece, as are also the cam and cup. All the working parts are hardened, ground and made of alloy steel. An inside trip can be furnished. A screw in the side of the head provides for varying the diameter.

— 131 —

Dies and Die - Holders, Screw - Cutting, Adjustable, "Threadwell." *Wells Corp., Greenfield, Mass.* [A. M., vol. 58, p. 778.]

The die is made in a range of sizes from $\frac{1}{4}$ to 1 in. diameter, with six changes of outside dimensions. It is hexagonal in shape and adjust-



able for size by means of a screw. Aluminum stocks are provided to hold the dies. For use upon the screw machine or turret lathe two forms of holders are made. One has a shank as shown to be fitted to the turret, while the other is designed as an adapter to go into already existing holders. The full length holder incorporates the releasing or "slip-off" feature employed for cutting threads up to a predetermined length. Considerable freedom of movement of the die is allowed in the holder. Holes in the body provide for a free flow of cutting compound. The holders are made in six sizes.

See Drilling Machines.

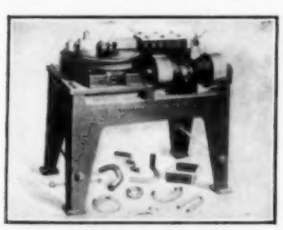
See Small Tools for Cutting Tools.

Other Machines

— 132 —

Bending Machine, Power-Driven, No. 15. *Wallace Supplies Manufacturing Co., 412 Orleans St., Chicago, Ill.* [A. M., vol. 58, p. 495.]

The machine is intended for the hot and cold bending of metal bars and structural shapes. It is controlled by a hand lever and is provided with an adjustable stop mechanism. A number of pieces

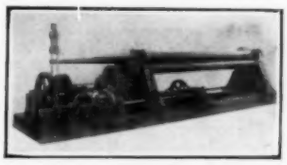


can be bent identical in shape to any desired number of degrees. The table rotates at 6 r.p.m. A circle 8 in. in diameter is the largest that can be formed. For cold bending, these sizes are maximum: squares and rounds, 1 in.; flats, $\frac{3}{4}$x2 in.; and angles, 2x2$\frac{1}{4}$ in. For hot bending, the maximum sizes are, squares and rounds, $1\frac{1}{8}$ in.; flats $\frac{3}{4}$x2 in.; and angles 2$\frac{1}{2}$x2$\frac{1}{2}$x$\frac{5}{16}$ in. A 3-hp. motor is sufficient to drive the machine. Floor space, 3x4 ft. Weight, 950 pounds.

— 133 —

Bending Roll, Pyramid-Type, Power Driven, No. 2. *Cleveland Punch and Shear Works Co., Cleveland, Ohio.* [A. M., vol. 58, p. 821.]

The machine has a space between housings of 10 ft. 2 in., and is directly connected to a motor. This motor is arranged to lower

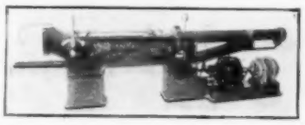


and raise the top roll, which is 11 in. in diameter. One of the lower rolls, which are 8 in. in diameter, has three splines, while the other has two splines and a flanging groove. None of the gears protrude into the foundation to require a pit. The outer hinge can be dropped after lifting the cover plate from the shoulder bolts. The roll can then be tilted for removing the completed cylinder.

— 134 —

Broaching Machine, Hydraulic, Pull. *J. N. Lapointe Co., New London, Conn.* [A. M., vol. 58, p. 887.]

The broach is pulled by a hydraulic cylinder and piston, operated by oil pressure derived from a motor or belt-driven pump. The pump and driving motor are mounted upon an extension to the right pedestal, which is the reservoir for free oil. A separate pump supplies cutting compound to the broach,

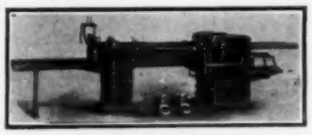


and the tank for this system is in the left pedestal. The cast-iron trough under the broach is supported by a hinge and may be swung back out of the way. The pressure pump runs continuously at a constant speed, and requires a maximum of $7\frac{1}{2}$ hp. Variable cutting speeds of the pull-rod are obtained by means of valves, which may be set and locked to provide a constant speed of pull. The maximum pull obtainable is 35,000 lb. The amount of stress upon the pull-rod is shown by the gage on the cylinder. The maximum rate of travel of the pull-rod is 25 ft. per minute in either direction. The length of the stroke is 56 in. Floor space, 13 ft. 6 in. by 2 ft. 3 in. Weight, 3,500 pounds.

— 135 —

Broaching Machine, Duplex, Pull, Improved, No. 4. *Lapointe Machine Tool Co., Hudson, Mass.* [A. M., vol. 58, p. 890.]

The machine has been improved so that the number of working parts has been reduced. A single-speed machine is available, as well as the two-speed machine formerly made; it can be furnished with speeds of 48, 72 or 96 in. per minute. Tight and loose pulleys are provided and no countershaft is needed. The two pull screws are entirely independent of each other in operation. They are $2\frac{3}{4}$ in. in diameter and can be regulated to take broaches up to 50 in. long. Positive driving clutches are used, and friction clutches to give a quick return at four times the cutting speed. The capacity in steel is for key-

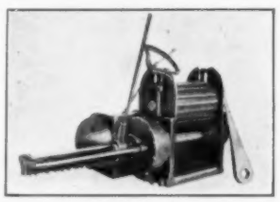


ways up to 1 in. wide, and square holes up to $3\frac{1}{4}$ in. across the flats from drilled holes. A 10-hp. motor is recommended. Floor space, 180x40 in. Weight, 5,000 pounds.

— 136 —

Bundling Machine, Scrap-Metal, Rotary, Tempus, No. 3. *Samuel H. Garrett, 234 N. 13th St., Philadelphia, Pa.* [A. M., vol. 58, p. 201.]

The machine is for tightly compressing into bundles, without shearing, miscellaneous metal scrap, such as tangled wire, cotton ties, bushy turnings, bicycle frames, upholstery springs, and sheet metal parts from automobile bodies. On the base is mounted a 5-hp. motor when individual drive is required. All moving parts of the drive mechanism are inclosed. The winding mandrel is driven through a reversing friction movement and worm gearing. The wormwheel runs in oil and has a ball



thrust bearing. There are rotating disks at each side of the machine, against which the ends of the bundles are formed. The curved surface on which the bundle is formed is chilled. The winch head is provided for drawing the material to the front of the machine, and also for unloading it from trucks.

— 137 —

Combination Machine Tool, Floor-Type, Improved. *Triplex Machine Tool Corporation, 18 East 41st St., New York, N. Y.* [A. M., vol. 58, p. 499.]

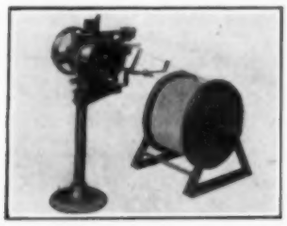
The floor stand and chip pan can be removed if the

machine is desired on a wooden bench. The distance between centers and the swing over the carriage have been increased from 11 to 14 in. and from 8 to 10 in., respectively, with a corresponding increase in weight to 535 lb. Also, S.K.F. ball bearings are used instead of bronze for the change gear shafts. The starting box is mounted on the head. The maximum speed of the motor is 1,050 r.p.m. and the minimum speed 90 r.p.m. Other minor changes have been made in the design.

— 138 —

Cutting Machine, Measuring, Cable, Automatic, K. N., No. 3. *Artos Engineering Co., 306 Milwaukee St., Milwaukee, Wis.* [A. M., vol. 58, p. 747.]

The machine will cut heavy flexible and semi-flexible materials such as copper and steel wires, cables and straps up to 3 in. in width into lengths varying from 14 in. to 14 yd. The cutter head

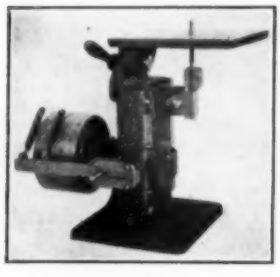


rotates and pulls the cable from the reel, the cable being held between the clamp base and one clamp. The knives on the levers cut with a scissor effect against blades mounted on the base. The length of cut is decided by the position of the gage. When cutting pieces 14 to 28 in. in length, both knife levers are in action. For pieces 28 in. in length one of the knives is brought out of action. The machine automatically measures, cuts and records the number of pieces cut. It is power driven and has a clutch pulley.

— 139 —

Filing Machine, Bench, Power-Driven. *Hugold Anderson, 201 Eddy St., Providence, R. I.* [A. M., vol. 58, p. 237.]

The machine is especially intended for shaping dies, forming tools and fly-cutters.



It is ordinarily driven by belt at a speed of from 350 to 400 r.p.m. It is provided with tight and loose pulleys and with a spring lock for the belt-shifting device. The slide reciprocates vertically and the stroke is 1¼ in. in length. The file-holder is adjustable and can hold standard machine files up to ¼ in. in size. The table can be tilted either backward or forward to about 30 deg. It is 7 in. square and has a height of 10 in. above the bench.

— 140 —

Flexible Shaft Outfit, Motor-Driven, Sioux, No. 802. *Albertson & Co., Sioux City, Iowa.* [A. M., vol. 58, p. 114.]

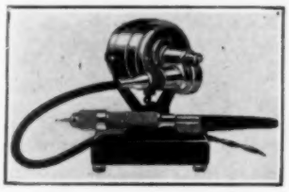
The outfit is adapted for a number of uses such as valve grinding, carbon cleaning, tool and small part grinding and drilling. In conjunction with its attachments it is intended especially for repair shops and service stations. A ¼-hp. a.c. motor provides the power to the shaft. The shaft has a universal joint and spindle control and is made of strands of piano wire, wound compactly one on top of the other. A feature of the shaft is the use of roller bearings about 6 in. apart throughout its length to prevent contact of the shaft and housing when bent. The device is started and stopped by a clutch and has a variable speed by means of a 3-step cone pulley. The attachments include an abra-

sive wheel, a 4-in. wire brush, a ¼-in. Jacobs chuck, a valve grinding attachment and a carbon cleaning brush. A 6-in. wheel is permanently attached to the motor.

— 141 —

Flexible Shaft Outfit, Utility Tool, Motor-Driven, Geared, "Dumore." *Wisconsin Electric Co., Racine, Wis.* [A. M., vol. 58, p. 566.]

The tool is intended for delicate drilling, engraving and die-sinking work. A feature of the outfit is the aluminum hand-piece, fitted with a double row of S.K.F. ball bearings. A No. 0 Jacobs chuck is used. It will hold tools from ⅛ in. down to a No. 80 drill, and rotates at speeds from 500 to 2,000 r.p.m. The speed is controlled by a 5-speed rheostat in the base of the unit. A motor which operates on either alternating or direct current drives the shaft through worm and gear. The

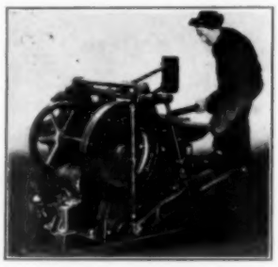


motor pivots in brackets attached to the base. A No. 7 S. S. White hand-piece with a special adaptor and coupling, and a foot controlled rheostat can be furnished.

— 142 —

Hammer, Smithing, Power, General Utility, "Mechanical Helper." *Blacker Engineering Co., Inc., Grand Central Terminal, New York, N. Y.* [A. M., vol. 58, p. 91.]

The hammer is intended for use on forging work ordinarily performed under hand swung sledges and too small to be done under steam

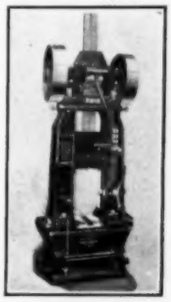


hammers. Material up to 2½ in. thick is handled, although larger sizes can be cared for. The maximum blow is four times that delivered by a human striker, and 140 blows can be struck per minute. The force of the blow varies directly with the depression of the treadle extending around the anvil. The hammer has a lateral motion controlled by a winged foot lever, thus enabling the head to be traveled along the face of the anvil. An anvil and a block of special design to suit the hammer are furnished. The hammer can be driven by a 1-hp. motor or can be run by belt. The motor is mounted on a small stand on the base and geared to a large driving gear placed on the main shaft. Weight: hammer, 1,300 lb.; special anvil, 560 lb.; stand, 336 pounds.

— 143 —

Hammer, Drop, Board, Power-Driven. *Erie Foundry Co., Erie, Pa.* [A. M., vol. 58, p. 855.]

Among the features of the hammer are the wedge adjustment of the frames across the anvil, the use of bolts and separators between the frames at the top and bottom, and an improved type of latch. The use of the wedges eliminates the screw adjustment. The point of knock-off can be conveniently changed. Anvil blocks are available in the ratio of 15 to 1 or of 20 to 1 to the weight of the ram. The sow block is of forged steel and is held in the anvil by planing the side opposite to the key to a V-shape. The anvil

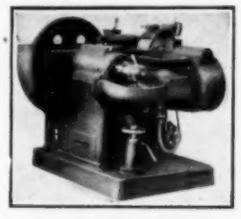


and frame are made from semi-steel, but can be furnished as open-hearth steel castings. The ram is available in either forged or cast steel, and the pulleys in wood, paper or steel. The hammer is built in seventeen sizes having rams weighing from 200 to 4,000 lb., and with ram areas from 7x9 in. to 26x24 inches.

— 144 —

Hobbing Machine, Gear, Simplified. *Cincinnati Gear Cutting Machine Co., Cincinnati, Ohio.* [A. M., vol. 58, p. 712.]

The machine was designed to produce very accurate gears of a given size in large numbers. The hob of the machine has no movement except that of rotation, since the work is carried on a spindle and fed out over the hob. The arrangement gives simplicity of design. The 34-in. master indexing gear is mounted directly on the end of the work spindle, and the proper relation between the rotation of the cutter spindle



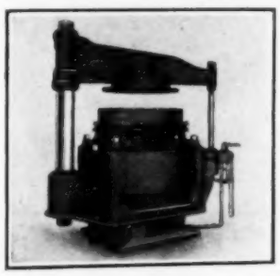
and the work spindle is maintained through four gears. The feed movement is obtained by means of a lead screw running in a nut inside the work spindle, and the rotation of the spindle in indexing advances the work. The feeding mechanism is arranged for rapid traverse also. The cutter spindle is driven by an 8-thread worm.

A flywheel weighing 300 lb. is mounted directly on the end of the cutter spindle. The machine will cut gears up to 7 in. in diameter, 4½ in. face and 4 d.p. in steel. It weighs 6,000 pounds.

— 145 —

Molding Machine, Railroad Car Wheel. *William H. Nicholls Co., 2 College Place, Brooklyn, N. Y.* [A. M., vol. 58, p. 814.]

This combination jolt, squeezer and stripping molding machine produces sand

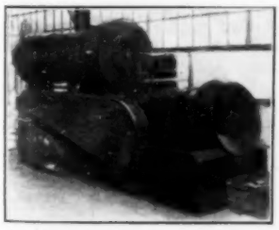


molds for standard 33-in. railroad car wheels. It is intended for use instead of a plain jolt machine. The machine first jolts the mold about six times, after which the pattern table is elevated, thereby bringing the mold in contact with the top platen. On this platen is a tucking plate, so that when the pressure is exerted the sand is evenly distributed throughout the flask. The pattern is then drawn on the exhaust stroke of the squeezing piston. The mechanical operations require about 13 sec. A press of 30,000 lb. capacity is incorporated in the machine. The total weight is in excess of 11,000 pounds.

— 146 —

Quenching Tank, Rotary, Automatic. *W. S. Rockwell Co., 50 Church St., New York, N. Y.* [A. M., vol. 58, p. 313.]

The design is based upon the principle of the Rockwell automatic rotary furnace, with which it is shown mounted. After the material being treated has been slowly brought up to temperature and discharged from the furnace, it slides quickly into the submerged end of the



quenching tank. Here it is automatically picked up in small batches by the internal thread of the rotating tank and conveyed through the quenching fluid as it is raised to the discharge spout at the front. The quenching fluid flows through both the outer tank and the rotating tank. Each piece of the work is given the same treatment. The only labor required is that for supervision. The tank is made in two sizes, the larger one being 8 ft. long, 6 ft. wide and 4 ft. 6 in. in height, and the smaller one 6x4x3 ft. 6 inches.

— 147 —

Riveting Machine, Vibrating, Rotary, No. 4. *Grant Manufacturing & Machine Co., Bridgeport, Conn.* [A. M. vol. 58, p. 638.]

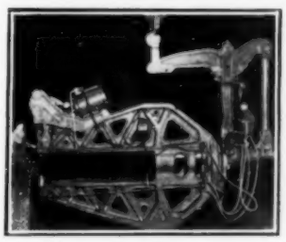
The machine is capable of handling a wide variety of work because of the depth

of throat and other features provided. Motor drive or belt drive can be furnished. When a cylindrical drum is to be riveted, a suitable horn is fitted to the machine. Control is by means of a treadle. The throat depth is 18½ in., which permits of riveting in the center of a 36-in. circle. Rivets up to ⅞ in. in diameter can be headed.

— 148 —

Riveting Machine, Pneumatic, Portable, 150-Ton. *Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill.* [A. M. vol. 58, p. 676.]

The machine is for use particularly when riveting the plates forming the volute

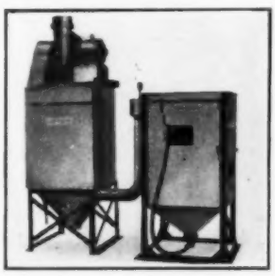


of the casing and penstock on a hydraulic turbine. The frame can be revolved around on the spindle out of its vertical plane, and also tilted upward or downward to an angle of 30 deg. from the horizontal. When the frame is revolved or tilted the center of gravity of all the parts hanging from the crane hook is neither raised nor lowered, due to the method of suspension with the crane hook directly above the center of gravity of the machine. Revolving and tilting are performed by two reversible pneumatic motors of 2 hp. each. Roller and ball bearings are employed at all points of rotation. The riveting mechanism mounted on the machine consists of a combination of toggles that develop a predetermined maximum pressure, and hold it during the last half of the piston stroke and last 1 in. of die travel. Complete manipulation of the machine is possible from one position at the head. The machine has a reach of 118 in. and a gap of 30 in. Total weight 57,750 pounds.

— 149 —

Sandblasting Unit, Barrel-Type, Complete. *Pangborn Corp., Hagerstown, Md.* [A. M. vol. 58, p. 889.]

The machine is for cleaning small work and a small volume of parts such as produced in moderate sized plants. The unit has an exhauster, cloth-screen dust arrester and motor drives for the barrel and exhauster. The parts are shipped fully assembled and ready for operation by connecting with a



ventilating pipe and compressed air. A single nozzle is used in the drum. Two sizes of drum are available. The No. 1 barrel has a drum 20 in. in diameter and 16 in. long, and together with the dust arrester occupies a floor space of 3 ft. 3 in. x 7 ft. A drum 30 x 20 in. is provided for the No. 2 barrel, which occupies an overall floor space of 3 ft. 7½ in. x 7 ft. 5½ in. The overall height of each is 8 ft. 10 inches.

— 150 —

Hack Saw, Power, "Kwik-Kut," No. 7A. *E. C. Atkins & Co., Indianapolis, Ind.* [A. M. vol. 58, p. 205.]

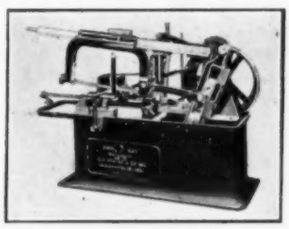
The machine is intended for precision work when sawing materials. It has a solid cabinet base, which contains the settling tank and reservoir for the cutting compound. A plunger pump is provided. The length of the stroke can be adjusted. The saw frame travels on a T-bar. The blade holder is equipped with a gage to indicate whether the blade is adjusted perpendicularly to the bottom of the vise. The feed of the machine is controlled by a hydraulic dash-pot, so that the amount can be varied by simply turning

a cock in the bypass. The dash-pot serves also as a cushion to the raising device, so that the blade is lowered into the cut without a jar.

— 151 —

Hack Saw, Power, Improved, "Kwik-Kut," No. 18. *E. C. Atkins & Co., Indianapolis, Ind.* [A. M. vol. 58, p. 959.]

The machine has a solid cabinet base containing settling tank, reservoir and pump. An automatic adjust-



ment of the length of stroke is provided. The blade holder is self-adjusting, so that the blade is always kept straight in the frame. The mechanical feeding device is controlled by a hydraulic dash-pot, that allows the amount of feed pressure to be varied. A cushioning effect is also produced to prevent jarring when the blade is lowered into the cut. Bronze link-blocks and bushings are used on the driving crank. With a solid vise the capacity is 8 x 8 in. The belt-driven machine occupies a floor space of 60 x 26 in., has an overall height of 40 in. and weighs 950 lb. Motor-driven machines can also be supplied, and 1¼ or 1½ hp. is necessary.

— 152 —

Screwdrivers, Power-Driven, Bench. *Hergi Manufacturing Co., 250 Fifth St., Bridgeport, Conn.* [A. M. vol. 58, p. 425.]

These belt-driven screwdrivers are for the rapid setting of screws in small assembling work. The machine is made in three sizes, and screws up to ¼ in. may be tightly set. The vertical machine shown can be fitted with an elevating table to hold fixtures. The idlers may

lead the belt from an overhead countershaft or from below the bench. The pulley at the top of the spindle runs continuously and the spindle itself is ordinarily stationary. As the work is pressed upward the protecting sleeve recedes and allows the blade

of the screwdriver to enter the slot in the head of the screw. Further pressure engages the friction in the hub of the pulley to start the spindle and drive the screw. The same mechanism can be mounted in a horizontal position.

— 153 —

Shear, Angle-Iron, Hand-Operated, No. 4. *Whitney Metal Tool Co., 91 Forbes St., Rockford, Ill.* [A. M. vol. 58, p. 388.]

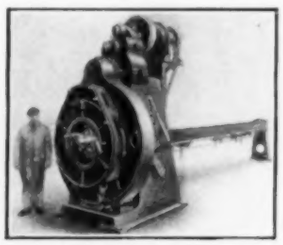
The machine is intended for shearing angle iron up to 2 x 2¼ in. in size, will operate without the necessity of clamping the angle and will shear without distortion. The frame is a solid steel casting and the cutting is done by

means of inserted tool-steel knives. A rest pad for the angle iron is cast integral with the frame of the machine, so that the iron can be sheared without distortion. By means of the eccentric gear, uniform leverage is obtained with the handle at any position. The machine is supplied with a short socket handle, so that a 1-in. iron bar or section of pipe can be used for a handle. Weight, 41 pounds.

— 154 —

Shearing Machine, Tube and Pipe, Power-Driven. *Tube Shear Co., Marquette Bldg., Chicago, Ill.* [A. M. vol. 58, p. 953.]

The principle of operation is one of shearing over a mandrel with a non-rotating ring shearing-knife. It is not necessary to chuck or grip the tubing, as neither the shear knife nor the tubing rotate. The machine is a back-geared, single-revolution shear, operated by a treadle through positive clutch mechanism, and is handled the same as a standard plate or bar shear. It has a fixed stroke with adjustments for the knife and also for the knife alignment. The shearing angle depends upon the difference in diameter between the shear knife and the outside diameter of the tube, and is controlled by the main knife adjustment. The comparative flexibility of the mandrel due to its length is compensated for by supports which position automatically as the tube is



being fed out on rolls. Shearing up to the last inch of the work is possible, since chucking is eliminated. The shearing knives are plain hardened rings and easily accessible for removal.

— 155 —

Soldering Machine, Commutator, "Allatonce." *P. E. Chapman Electrical Works, 10th and Walnut Sts., St. Louis, Mo.* [A. M. vol. 58, p. 128.]

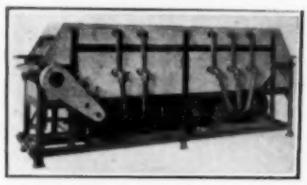
The machine is for soldering all the joints of small commutors at once. A large volume of melted solder is carried in a bath in the machine, heated by a gas burner and surrounded by a protective jacket. The commutator

is held in a container above the bath. The height of the solder is then raised to the joints by depressing the treadle. The machine is ordinarily made in two sizes. The larger size can be fitted for soldering two commutors at once. Small machine: capacity for commutors ¾ to 2 in. in diameter, up to 2 in. in length; floor space, 15 x 18 in.; weight, 130 lb.; capacity, 30 lb. of solder. Large machine: capacity for commutators, 2 to 4 in. in diameter, and 3 in. in length.

— 156 —

Washing Machine, Metal-Parts, Improved, "Autosan." *Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn.* [A. M. vol. 58, p. 605.]

The machine is made on the unit principle with a frame work of light structural steel, and can be furnished in practically any desired length by joining units. The pumping units are self-contained, each being provided with a centrifugal pump, driving motor and independent control, all mounted upon a cast-iron base. The control lever stops the movement of the conveyor without stopping the sprays. Should a piece of work catch in the conveyor, the machine will stop and remain inoperative until the piece is dislodged. The conveyor is made up of links ½ in. thick and is supported by a series of rollers. The spray chambers are mounted

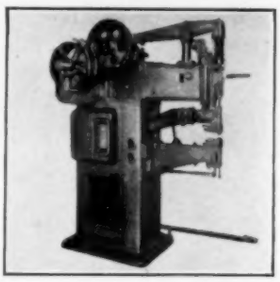


from the outside of the hood. Large tanks hold the soda solution and rinsing water, and each tank has a steam coil. Ten sizes are made.

— 157 —

Welding Machine, Spot, Electric, Automatic, Power, No. 75. *Thomson Spot Welder Co., 161 Pleasant St., Lynn, Mass.* [A. M. vol. 58, p. 532.]

The machine is for work on disk wheels, crankcases and similar heavy pieces. Its normal capacity is two $\frac{5}{16}$-in. iron or steel plates, but it will stand an overload up to ½ in. thickness of metal. A



spring provides a maximum pressure of 2,000 lb. per sq. in. on the die points. The dies or electrodes are of large diameter and have water-cooled die-blocks. The throat depth is 2 ft. A drop horn may be supplied. A hand lever elevates the upper welding head 1¾ in., in addition to the ¾ in. normal opening of the electrodes. The machine is provided with a trip clutch and may be operated in cycles of one spot or continuously. Automatic make-and-break switches are provided. The machine has an electric capacity of 100 kva. and 75 kw. at 75 per cent power factor. Floor space, 67½x29½ in. Height, 81 in. Weight, 4,200 pounds.

Measuring, Gaging and Testing Equipment

— 158 —

Rule, Stainless Steel, 6-Inch. *Brown & Sharpe Manufacturing Co., Providence, R. I.* [A. M. vol. 58, p. 315.]

The steel from which this 6-in. pocket rule is made is of such nature that it will not stain, discolor nor rust. The rule is furnished with scales

graduated in eighths, sixteenths, thirty-secondths and sixty-fourths of an inch. The graduations can be more easily read than on the ordinary rule because of the fact that the rule always has a bright finish, and does not become blackened from use.

— 159 —

Rule, Stainless Steel, 12-Inch. *Brown & Sharpe Manufacturing Co., Providence, R. I.* [A. M. vol. 58, p. 678.]

Except for the length, the 12-in. rule is the same as the 6-in. rule described on page 315 and just mentioned here.

— 160 —

Micrometer, Inside, Improved. *J. T. Slocomb Co., Providence, R. I.* [A. M. vol. 58, p. 532.]

The tool is similar to the former Slocomb micrometers. It cannot be put out of adjustment by careless handling, because it must be taken apart to make adjustments. It can be locked with a bind-

ing screw to preserve the setting. Three sizes of the micrometer are available, 3 to 4 in., 4 to 5 in. and 5 to 6 in. Each can be provided

with caps to increase the length, so as to measure internal diameters larger than marked on the tool.

— 161 —

Measuring Tape, Outside Diameter, "Out Slide Mikes." *Schaap Co.*, 344 *Cumberland St., Brooklyn, N. Y.* [A. M. vol. 58, p. 462.]

The device is for measuring outside diameters on work such as pistons, and reads directly in fractions of an inch and thousandths of an inch oversize. It is made of one piece of sheet steel and

measures diameters from 2⅝ to 5⅞ in. The fractional size is read at the point where the arrow matches the scale, and the thousandths of an inch over the fractional size are obtained by matching the graduations on the two ends of the device, as when reading any instrument having a vernier. The graduations are large. A smaller instrument measuring diameters from ⅝ to 2⅝ in. is also made.

— 162 —

Gage Set, Micrometer Setting, 0.0001-Inch. *Van Keuren Co.*, 362 *Cambridge St., Allston, Boston, Mass.* [A. M. vol. 58, p. 781.]

The set is intended mainly for checking micrometers, and for direct use on parts being machined. It contains thirty-five gages. The sizes provided are: A ten-thou-

sandths series of ten gages from 0.1000 to 0.1009 in., a thousandth series on ten gages from 0.101 to 0.110 in.; a hundredth series of nine gages from 0.12 to 0.20 in.; and additional gages of 0.3, 0.5, 1, 2, 3 and 6 in. Over 140,000 combinations are available. The range of the set is up to 14 in. in length.

— 163 —

Gage, Dial, Simplified, No. 55. *B. C. Ames Co., Waltham, Mass.* [A. M. vol. 58, p. 350.]

The device embodies several improvements in construction over the previous type. It has only 39 parts. Both the rack wheel and the take-up wheel with the spring are on one large staff, and only one bridge is required

to support these parts and the center pinion. It is claimed that the gage can be badly abused and yet retain its smooth spindle action and accuracy. A tolerance of only 0.0005 in. plus or minus is allowed by the manufacturer in the entire spindle travel, which is 0.3 in. The dial is usually graduated into 100 parts reading 0.050 in. each way, but can be divided into 50 parts.

— 164 —

Indicator, Dial, Test, Attachment No. 729. *Brown & Sharpe Manufacturing Co., Providence, R. I.* [A. M. vol. 58, p. 203.]

By the use of the attachment, a dial indicator can be employed for testing internal surfaces and those not easily reached with the regular

straight spindle of the indicator. The attachment can easily be secured to the indicator. The arm is a bronze casting. The testing bar, which makes contact directly with the plunger of the indicator, is made of steel and accurately balanced. No adjustments are required, which reduces the possibility of inaccuracy.

— 165 —

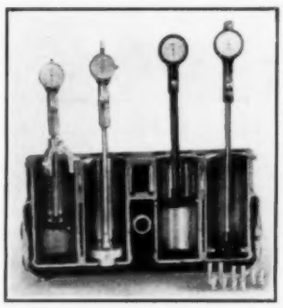
Indicators, Dial Models D and D-D. *Federal Products Corp.*, 15 *Elbow St., Providence, R. I.* [A. M. vol. 58, p. 889.]

The features of the new models are the large sized dials and the increased amplification of movement, showing but 0.020 instead of 0.050 in. variation plus or minus from zero. The dial may be set to give a zero reading for any position of the pointer, by turning the knurled bezel ring, which may be locked against accidental disturbance. The diameter of the dial of the Model D instrument is 2¾ in. and of the Model D-D on the left 2¾ inches.

— 166 —

Gages, Cylinder, Testing, Indicating. *Federal Products Corp.*, 15 *Elbow St., Providence, R. I.* [A. M. vol. 58, p. 642.]

The gages are for testing automotive cylinders, both for manufacturers and service stations. The gage at the left is intended for the manufacturer of cylinders, as its range is limited to ¼ in. changes in diameter. The centralizer is rested on the



end of the cylinder. The three feelers are withdrawn by a thumb button so that the tool may be entered in the bore. Upon release they contact with the cylinder walls and thus indicate the diameter of the bore upon the dial. The second gage from the left covers a range of ⅝ in. in diameter, and is for manufacturers who make more than one diameter of cylinder. The second gage from the right is similar to the first instrument described, but its two-point measurement adapts it to other than round work. At the right is a two-feeler gage to measure diameters from 2⅛ to 6 in. Several sets of interchangeable feelers or extensions are employed.

— 167 —

Hood, Dial Gage. *Federal Products Corp.*, 15 *Elbow St., Providence, R. I.* [A. M. vol. 58, p. 780.]

This protecting hood is used in connection with the Federal cylinder gages just described. The hood surrounds, but does not touch the indicator. The recess is somewhat larger than the diameter of the indicator and its depth greater than the thickness of the latter. Although the dial is plainly visible, it is well protected from blows.

— 168 —

Gage, Dial, Micrometer. *Federal Products Corp.*, 15 *Elbow St., Providence, R. I.* [A. M. vol. 58, p. 643.]

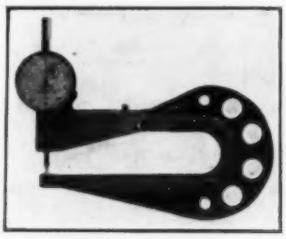
The tool consists of a bench stand for holding a dial indicator at any desired

angle, and a pair of micrometer jaws between which the work is inserted. It has a capacity from zero to ⅝ in. A collar holds the jaws open at a point just under the required diameter of the work to be gaged. An adjustable pin may be set to allow the work to enter to its full diameter between the jaws. The dial is graduated to read to 0.020 in. plus or minus in increments of 0.0005 in. The zero line is brought to the pointer by turning the bezel, which is provided with a clamp.

— 169 —

Gage, Dial, Thickness. *Federal Products Corp.*, 15 *Elbow St., Providence, R. I.* [A. M. vol. 58, p. 678.]

The gage is for indicating variations in thickness of material above and below a



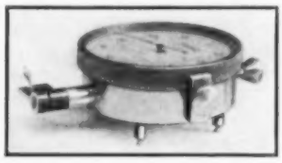
set standard. The frame is of steel with a wide rib around the throat. The measuring points may be made of any desired shape to suit the work. The tool will register variations from zero to ⅞ in. The dial is station-

ary and is graduated in 100 divisions, each representing 0.001 in. A "second hand" registers the number of complete turns made by the pointer, and the thickness of the work may be read in decimals from the positions of the two pointers. The gage can measure the thickness of wall of pistons under the ring grooves.

—170—

Gage, Dial Indicator, Micrometer. *Federal Products Corp., 15 Elbow St., Providence, R. I.* [A. M. vol. 58, p. 777.]

The instrument is for inspecting or checking errors in size of small parts. The jaws are opened by a pressure of the finger on the button at the top of the dial, and



then closed upon the work by the action of the spring. The direction and amount of variation from standard are shown by the position in which the pointer comes to rest above or below the zero line. The diameter of the dial is 2½ in., and the regular graduation is to 0.001 in. The instrument will gage any dimension up to ⅞ in. It rests ordinarily on the small legs shown.

—171—

Comparator, Dial. *Federal Products Corp., 15 Elbow St., Providence, R. I.* [A. M. vol. 58, p. 782.]

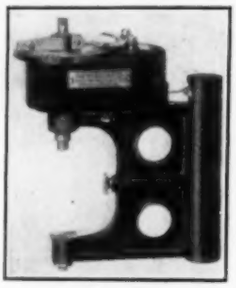
The instrument is intended for checking errors of dimension during the process of manufacture of small parts that are required to be within close limits of accuracy. It is primarily a

comparator for indicating the amount of departure from predetermined sizes. The base forms a table upon which to lay the work to be inspected, and is provided with tapped holes for attaching fixtures, which can be furnished to suit the work. An arm carries a dial indicator graduated to 0.0005 in. and registering a total variation of but 0.020 in. for each complete turn of the pointer. The arm may be elevated by means of the screw and crank handle and then clamped. Weight, 15 pounds.

—172—

Microgage, Gage, Indicating. *Microgage Co., P. O. Box 1,126, Boston, Mass.* [A. M. vol. 58, p. 856.]

This precision tool is intended to supplant snap and limit gages as applied to repetition or production work. The tool is a gaging rather than a measuring in-

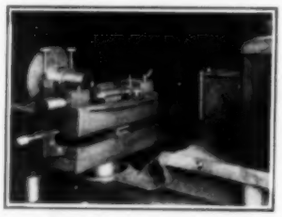


strument and its office is that of a comparator. A micrometer screw is turned into contact with the work by the tension of a spiral spring, and the pressure of contact is always uniform. With a standard piece between the points the zero line of the dial is set to correspond to a mark on the pointer. Any deviation of the work from standard is shown, both in amount and direction, by the position of the zero line of the dial in relation to the stationary pointer. The microgage is a "one-hand" tool. As the work touches the central button, the measuring spindle is moved forward automatically until it contacts with the work, in which position it is locked. The tool is made in sizes from 1 to 5 in., the range of each being 1 inch.

—173—

Comparator, Optical, Gear and Thread, Hartness. *Jones & Lamson Machine Co., Springfield, Vt.* [A. M. vol. 58, p. 353.]

The usefulness of the machine has been increased over the former model, as the machine will accommodate

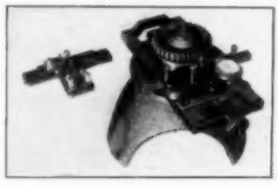


both small and large diameter threads and gears up to 20 in. in diameter. The shadow of the work is projected on a 20x24-in. mirror, and reflected back to a 36x44-in. ground-glass screen at the side of the machine. The fixture shown is used to mount centered work, such as taps, gages or hobs. A tooth is projected into a true outline on the screen and any error in form can be detected. An error in lead can be detected by inserting a size block equal to the lead between the anvils of the micrometer on the base and carriage. Screws for production work are mounted in cradles and the thread projected 200 times enlarged on a tolerance chart 5 ft. from the operator. The entire light source and lens system are in a self-contained unit. Lenses are supplied in three powers.

—174—

Testing Machine, Gear-Tooth. *Lees-Bradner Co., Cleveland, Ohio.* [A. M. vol. 58, p. 640.]

The machine measures the accuracy of that portion of the gear-tooth contour that conforms to an involute curve, and also measures the spacing of the teeth. It is capable of indicating errors as small as 0.0001 in. A disk on the work arbor is of the same diameter as the base circle of the gear to be

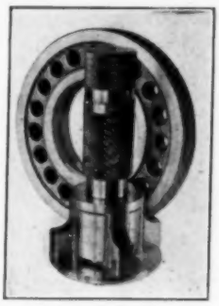


inspected. As the slide frame is rotated upon the work arbor, a tangent bar rolls about the base circle, and the point of the contact lever traces the involute of this base circle. If the tooth curve is a perfect involute the hand of the indicator attached to the contact point will stand at zero while the point travels from the base circle to the top of the tooth. The error can be read at any point of the contour. When testing the tooth spacing the indexing fixture shown at the side is placed on the machine. If the spacing is not uniform, the indicator shows the magnitude of error to 0.0001 inch.

—175—

Micrometer, Thread, Internal, Improved. *John Bath & Co., Inc., Worcester, Mass.* [A. M. vol. 58, p. 168.]

The combination of the sliding-wedge-operated jaws with the micrometer screw gives a minute adjustment of diameter. The space between figures on the thimble corresponds to a variation of 0.001 in. at the measuring jaws, each division being subdivided into ten equal spaces. The outer flange protects the jaws and acts as a pilot, the thread of which is 0.020 in. smaller in pitch diameter than the nominal size of the tool. Four grooves cut across the periphery of the pilot assist



in cleaning out the threads to be measured. Each size of micrometer is supplied with a master ring recessed upon both sides, with holes through the web. By a recess half way down, the threaded portion is divided into two equal parts, to avoid "bell-mouthing" of the gage. The micrometer can be supplied in all commercial sizes from ¾ to 8 in. The capacity of each is from 0.020 in. below to 0.020 in. above size.

—176—

Gage, Thread Lead, Indicating. *Federal Products Corp., 15 Elbow St., Providence, R. I.* [A. M. vol. 58, p. 678.]

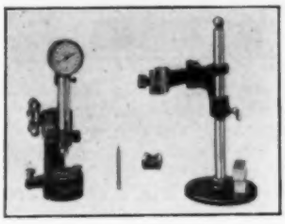
An elevating platen or table is provided on the front of the column upon which to lay the work. The capacity of the tool is for diameters up to 2 in., and pieces of any

length may be tested. The measuring point at the left is fixed, while the other point may be inserted in any one of the four holes in the bar to include lengths of ¼, ½, 1 or 2 in. between the threads to be tested. To test a thread, a master is first laid on the platen and the dial turned to bring the zero line under the pointer. When substituting a work piece for the master, the pointer indicates the variation from the true lead.

— 177 —

Scleroscope, Recording, Dial, Model-D. *Shore Instrument & Manufacturing Co., Van Wyck Ave. and Carll St., Jamaica, N. Y.* [A. M. vol. 58, p. 169.]

The instrument is similar to Model C1 in employing a hammer dropped on the work, but it indicates the hardness on a circular dial and also gives a permanent record of the value. The hammer is considerably longer and heavier and is allowed only a ¾ in. drop. The height of rebound is proportional to the hardness of the piece. The mechanism for catching the hammer at the top of the rebound consists of a sensitive, one-way ball clutch and pilot sleeve. When the hammer is released, the pilot sleeve and clutch fall with it and cause it to be held in position at the top of its rebound. When the hammer is brought again to its upper or starting position, it actuates a rack and pinion and hair-spring pointer mechanism to indicate on the dial the amount of rebound, and therefore the hardness of the specimen. The instrument can be mounted on the swinging arm of the stand at the right.



— 178 —

Scleroscope Pedal, Pneumatic, "Sico." *Shore Instrument & Manufacturing Co., Van Wyck Ave. and Carll St., Jamaica, N. Y.* [A. M. vol. 58, p. 203.]

The Model-C scleroscope can be operated by means of the pneumatic pedal which takes the place of the hand-operated bulb. It provides the sensitiveness and responsiveness that can be obtained by means of the hand bulb. The pedal mechanism is secured to the floor. Its chief feature is the fact that it leaves both hands of the operator free to handle the work. Pressing the pedal downward releases the hammer of the scleroscpoe by the pneumatic action. The required suction and compression are obtained by the use of a para rubber diaphragm so mounted that practically all wear due to chafing is eliminated. The pad which goes over the top of the operator's foot is adjustable in position.

— 179 —

Tester, Hardness, Pendulum. *Edward G. Herbert, Ltd., Chapel St., Levenshulme, Manchester, England.* [A. M. vol. 58, p. 817.]

The instrument can test the hardness of substances ranging from lead to sapphire. It consists chiefly of a ball 1 mm. in diameter held at the center of the device, and six screw - actuated weights by which the center of gravity of the whole instrument is adjusted to coincide with the center of the ball. Above the ball is a graduated cylindrical weight mounted on a screw. By raising or lowering this weight, the center of gravity of the instrument can be brought to a predetermined distance above or below the center of the ball. If the instrument is tilted to the right until the bubble comes to zero on the scale at the top, it will swing as a pendulum. The position of the bubble on the scale at the end of the first swing shows the hardness by the "scale test." The time in seconds taken in making ten swings on any substance represents its "time hardness number." The instrument is made in weights of 2 and 4 kg. It is 12 in. long and will span flat surfaces 6 in. wide or cylindrical specimens 8 in. in diameter. The equipment includes a levelling table, the universal ball vise shown, a stop watch and extra balls.

— 180 —

Testing Machine, Fatigue, Farmer Type. *F. H. Bultman Co., Cleveland, Ohio.* [A. M. vol. 58, p. 675.]

The machine records the number of alternations of stress which may be applied to a specimen before it is destroyed. It consists of a housing in which are mounted ball bearings for carrying the specimen in a horizontal position. The specimen is driven by a motor or belt. Two suitably mounted ball bearings are also provided which are put on the specimen to carry the weights that apply the load. At one end of the machine is a revolution counter, so arranged that when failure occurs the counter will stop. Weight, packed for shipment, 54 pounds.

— 181 —

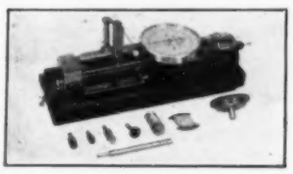
Testing Machine, Impact, Izod. *F. H. Bultman Co., Cleveland, Ohio.* [A. M. vol. 58, p. 677.]

The machine tests the ability of the specimen to withstand a sudden shock or blow. A pendulum 4 ft. long and weighing 60 lb. is mounted on ball bearings, swings between two frames, and is provided at its lower extremity with a hardened tool-steel bar for breaking the specimen. A standard specimen is first placed in the vise. After raising the pendulum, it is released by the trip and allowed to swing and strike the specimen. The breaking of the specimen absorbs some of the energy of the pendulum and causes the latter to fail to rise to the full height of its unimpeded swing. The dial at the top thus reads directly the number of foot-pounds of energy used in breaking the specimen. A floor space of 4 x 10 ft. is required for operating the machine. Weight, 1,200 pounds.

— 182 —

Tachograph, Hand, Speed Recording, O-Z. *O. Zernickow 15 Park Row, New York, N. Y.* [A. M. vol. 58, p. 168.]

The tachograph is essentially a tachometer with an attachment by means of which charts can be made to graphically record the speed of a mechanism. Fluctuations of speed, whether as slight as 1 or 2 per cent of the total speed, or of greater variation, can be recorded. The speed of travel of the paper can be varied by a lever on top of the clockwork. The time is indicated along longitudinal lines and the speed by the vertical height. The disks draw parallel longitudinal lines on the strip of paper. A pen draws a line indicating the relative speed of the work. The actual speed in the test is shown by the dial. A second pen draws a small vertical line every second, being caused to operate by a clockwork mechanism. The ranges of the tachometer are controlled by the thumb slide on the instrument itself. A range from 60 to 8,000 r.p.m. is furnished, although a range from 30 to 24,000 r.p.m. can be supplied.



— 183 —

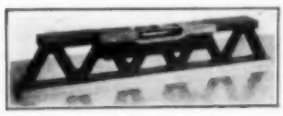
Watches, Time-Study. *A. R. & J. E. Meylan, 552 Seventh Ave., New York, N. Y.* [A. M. vol. 58, p. 202.]

These Swiss watches are made in a number of styles and have jeweled movements. Timers indicating in ⅛ sec. can be furnished with either 11, 15 or 18 jewel movements. In the timer illustrated, divisions of $\frac{1}{10}$ sec. are indicated and the movement makes 36,000 vibrations per hour. The hand makes one complete revolution every 30 sec. A hand on a small dial indicates the number of minutes that have elapsed. This type can be furnished as a chronograph for indicating the time also, as on an ordinary pocket watch. It can also be supplied with two hands to make a double-acting instrument. A timer of the fifth-second type is made for service in research work when timing intermittent operations.

— 184 —

Level, Precision, 15-Inch. *Pratt & Whitney Co., 111 Broadway, New York, N. Y.* [A. M. vol. 58, p. 94.]

The level is for use in setting up machines, and is 15 in. in length and of trussed frame construction. When

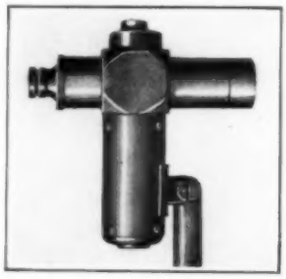


applying the level to the work, the thumb of each hand grasps the insulated grips, the finger tips touch the work first and then the level is gently brought into contact. For general shop use, a 10-sec. level is employed, with each division of 0.1 in, indicating a variation from the horizontal of 0.0005 in. in a 1-foot length. A 3-sec. level can be furnished. An adjusting screw is provided on the top of the device. A case is furnished for the level.

— 185 —

Pyrometer, Radiation, High-Temperature, Ardometer. *Bacharach Industrial Instrument Co., Pittsburgh, Pa.* [A. M. vol. 58, p. 780.]

The device consists of a telescope, with objective and ocular lenses, between which is located a small thermal element in a sealed glass bulb. When the temperature of an incandescent body is to be taken, the instrument is sighted directly on this body, the total radiation of a definite area of the body being concentrated upon a blackened platinum disk by the objective lens. Thus the hot junction of the thermo-couple is heated and the emf. generated sends through the circuit a current which causes a deflection of the galvanometer pointer. Standard scales having maximum read-



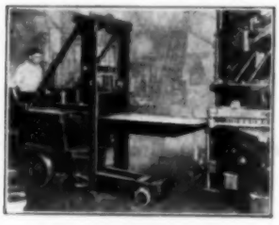
ings of from 2,200 to 4,600 deg. F. are available. The Ardometer may be permanently installed or used as a portable instrument. The glowing area must possess a diameter of a least 2.6 in. when 3 ft. from the instrument. Weight, 1 pound.

Material-Handling Equipment

— 186 —

Truck, Platform, Elevating, Electric, "Hy-Lift." *Baker R. & L. Co., 2180 West 25th St., Cleveland, Ohio.* [A. M. vol. 58, p. 93.]

The machine is for use in lifting, carrying and stacking heavy materials. The standard truck has a lift of 72 in., but it can be furnished with lifts of 48 and 60 in. The maximum capacity is 4,000 lb., lifted at a speed of 5 ft.



per min., while without load the elevating speed is 11 ft. per minute. Cable wound on drums is employed to lift the platform. One motor is furnished for lifting purposes and another for the motive power of the truck. The speed varies from 6 miles per hour without load to 4½ miles per hour with the rated load. The controller supplies three speeds forward and reverse. Overall length, 121½ in. Width, 38 in. Height, 100 in. Weight without battery, 3,710 pounds.

— 187 —

Truck, Elevating, Industrial, Electrical. *Eleveyor Industrial Truck Co., 56 Huntington St., Brooklyn, N. Y.* [A. M. vol. 58, p. 461.]

The machine may be used as an ordinary platform truck, or as an elevating and tiering machine. The forward end of the frame is carried on two large helical springs. The platform is one piece of pressed steel, supported by two helical springs, in the ends of the supporting arms. The arms extend from the carriage, which has widely spaced rollers that travel in

the vertical guides. The truck is designed to carry 2 tons, and the platform can be elevated through a distance of 70 in. A 2-hp. motor is employed for driving. All four wheels are steered by means of long lever arms, while only two are provided with driving power. A hoist driven by a separate motor elevates the platform by means of a chain. A 24-volt Exide storage battery is usually employed. The controller has three speeds each way. Model A has a platform 70x38 in. in size. Model B has a 60x28 in. platform.

— 188 —

Tote Box, Lift-Truck. *Clark Tructractor Co., Buchanan, Mich.* [A. M. vol. 58, p. 601.]

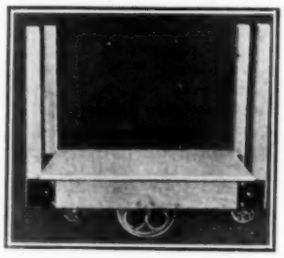
The box is made from hard wood and is held together by angle irons. The standard box has a capacity of 11 cu.ft. and is built to hold loads up to 4,000 lb. A floor space of 38x28 in. is occupied by it and it is 32½ in. in height. The boxes can be carried by either power-driven or hand lift trucks. A clearance of 11½ in. above the floor is pro-

vided between the legs on the side of greatest length for the power trucks, and of 7½ in. on the narrower side for hand trucks.

— 189 —

Truck, Shop, "Leader." *Tucker & Dorsey Manufacturing Co., Indianapolis, Ind.* [A. M. vol. 58, p. 604.]

The truck is of hardwood with cast-iron wheels and metal fittings. The swiveling end wheels are held be-

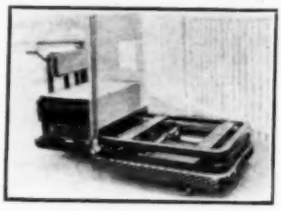


tween the end sills and the center platform girder by a heavy stamped-steel form. A rigid construction is obtained which prevents buckling under of the end wheels. The platform is triple nailed to a frame of 1⅝x6 in. section. The parts are firmly bolted together with heavy stamped-steel corner sockets into which hardwood removable stakes are inserted.

— 190 —

Elevating Attachment, Power-Driven Truck. *Plimpton Truck Co., Elm Court, Stamford, Conn.* [A. M. vol. 58, p. 965.]

The attachment can be furnished to fit the low loading platforms of practically any form of non-lift truck, thus providing elevating advan-

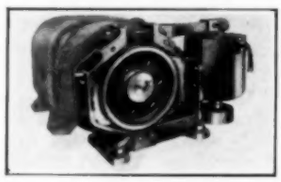


tages when it is desired to move loaded platforms. A downward 90 deg. movement of the handle elevates loads up to 3,000 lb. to a maximum height of 2 in. Descending loads are controlled by the retarding action of a hydraulic check. A storage chamber above the piston tube insures an excess of oil for operating. The symmetrical spacing of the roller bearing elevating wedges in each corner is stated to give load stability, ease of operation and good service.

— 191 —

Brake, Crane, Solenoid, Electric, Type-C. *Whiting Corporation, Harvey, Ill.* [A. M. vol. 58, p. 95.]

The electric solenoid brake is intended for crane service, and is suitable for heavy-duty



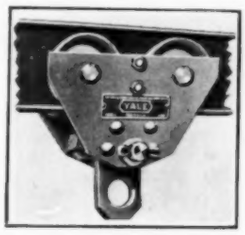
work where an automatic braking action is required. The shoes are easily removable. The arms are so pivoted that the shoes both bear and release equally at all points without dragging action. On d.c. brakes the large diameter plunger of soft iron gives a fast operating solenoid, even at light loads. The coils cause the brake to operate at about 40 per cent of the full-load current. The plunger on the a.c. brake is of laminated iron. The coils are wound with cotton-covered enameled magnet wire sufficiently large to carry the inrush of current.

— 192 —

Trolley, Roller-Bearing, Steel-Plate, Yale. Yale & *Towne Manufacturing Co., Stamford, Conn.* [A. M. vol. 58, p. 566.]

A reserve strength of seven

times its rated capacity enables the trolley to withstand great shocks and strains. The flexible construction permits each wheel flange to take a position suited to the curve of the I-beam flange. It is said that a 1-ton trolley will run easily on a 21-in. radius curve. The trolley has four



wheels with chilled-iron treads. The wheel axles are set parallel to the angled surfaces of the I-beam flanges. The axles are mounted on cylindrical roller bearings. Either a shackle, eye or clevis can be supported.

— 193 —

Derrick, Portable, Hand-Operated, 1-Ton, Barrett. *Barrett-Cravens Co.*, 1328 *West Monroe St., Chicago, Ill.* [A. M. vol. 58, p. 748.]

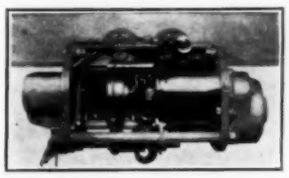
The device consists of a beam having a reach of 3 ft. 4 in. , a hoisting mechanism and a stand. There are sheaves at the end of the beam, which permit the load

to be carried with one, two or three strands of cable. The hoisting is done by means of two cranks. The block has a ball-bearing swivel shackle to prevent twisting of the cable. One operator can conveniently lift 300, 600 and 1,000 lb. by using, respectively, one, two and three strands of cable, with speeds of 50, 25, and 17 ft. per min. The standard type derrick, equipped with a 50-ft. cable, weighs 285 lb. The drum is capable of holding 300 ft. of cable.

— 194 —

Hoist, Electric, Mono-Rail, "Lo-Hed." *American Engineering Co., Philadelphia, Pa.* [A. M. vol. 58, p. 854.]

A feature of the hoist is its low headroom. A fully enclosed ball-bearing motor is employed. A dust- and moisture-proof controller is provided, which is normally held in the "off" position by a return spring. Hyatt "high-duty" type roller bearings are used throughout the hoist. The end housing contains the automatic lowering brake. The automatic holding brake is operated by a cam on the controller shaft and has asbestos brake band lining. A four-part rope block is supplied. The hoists are made in two types. Type H has either a plain or motor trolley, with capacities ranging from 2,000 to 12,000 lb. Type B can be furnished without a trolley or with the plain trolley; its capacities range from 1,000 to 6,000 lb. They are regularly equipped with rope operated, a.c. controllers

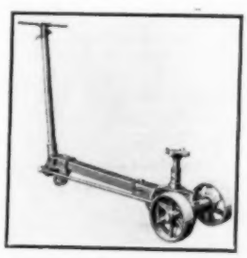


but dynamic lowering or remote-control types of controllers can be furnished. The headroom required ranges from 10 in. on a 1-ton hoist to 14 in. on a 3-ton hoist.

— 195 —

Jack, Garage, "New Way," Model B. *Weaver Manufacturing Co., Springfield, Ill.* [A. M. vol. 58, p. 129.]

The jack is intended for lifting and transporting automobiles where it is necessary to maneuver the machines sideways. It is both heavier and longer than the former model. The lifting standard can be telescoped, and gives heights from 8 to 17½ in. The standard is operated by raising and lowering the main handle of the jack. The front of the jack is supported on two wide-faced wheels

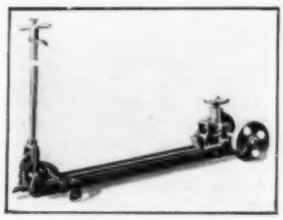


that run on an axle held in ball bearings in a pivoted housing. The axle can be swung by turning the handle top. The handle normally is held in an upright position. A large leverage is provided in the mechanism. Maximum lifting capacity, 5,000 pounds.

— 196 —

Jack, Garage, "High-Speed." *Manley Manufacturing Co., York, Pa.* [A. M. vol. 58, p. 239.]

This jack is for use in garages when lifting and moving automobiles and motor trucks. The device is made from malleable iron and steel, and rubber tires can be provided. The post of the jack is operated by means of the handle through racks and pinions. Only a small movement of the handle need be employed when lifting is being done in close quarters. The post itself can be traversed through a distance of 5¾ in. By means of a screw adjustment in the post, an additional increase in height of 4½ in. can be obtained. Rapid lowering can be obtained by lifting the release button on the top of the handle. The top of the frame member is only 3¼ in.



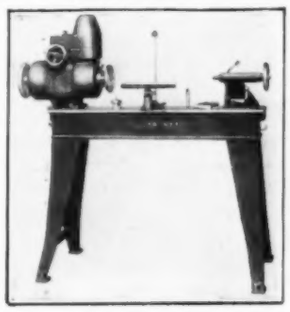
above the floor. The over-all length is 55 in. when the handle is raised; the handle is 48 in. long. Weight, 115 pounds.

Woodworking Machines

— 197 —

Lath, Speed, Motor-Head, A.C., Wood-Turning, No. 51. *Oliver Machinery Co., Grand Rapids, Mich.*. [A. M. vol. 58, p. 204.]

The lathe is similar in general characteristics to the former model, except that a greater speed range is provided. The motor can be operated on single-, two- or three-phase current, and provides the same flexibility of operation as obtained in a lathe driven by direct current. It is of the series-compensated type and can be fur-

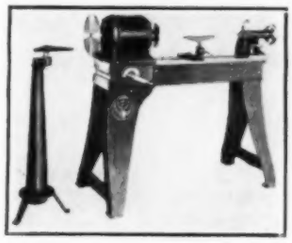


nished for any frequency from 25 to 60 cycles. The entire controlling mechanism is contained in the same housing as the motor. A push-button switch and handwheel control are provided. The speed of the motor can be varied by simply turning the control wheel, even while the motor is running. The machine may be arranged to carry a hand-operated tool carriage having a cross feed and a compound swivel rest. It will swing 12 in. over the bed, and take work 24 in. long between the centers with a 48-in. bed and 36 in. long with a 60-in. bed. Weight, plain with 48-in. bed, 600 pounds.

— 198 —

Lathe, Motor Headstock, Woodworking. *Little Giant Co., Mankato, Minn.* [A. M. vol. 58, p. 715.]

The lathe swings over the bed and toolrest 12 and 10 in., respectively. It occupies a floorspace of 24x50 in., and has an overall height of 48½ in. A ½-hp. motor equipped with ball bearings forms the headstock. It has four speed variations ranging from 570



to 3,450 r.p.m., which are obtained by shifting the control lever on the bed. The standard bed is 48 in. in length and the distance between centers 25 in. Two face plates are furnished, one at each end of the headstock. A hand feed carriage with cross feed and rest, and an automatic feed carriage can be furnished. Other attachments for woodworking operations may be supplied, such as a band saw, planer, and buffer.

— 199 —

Surfacers, Wood, Direct Motor-Driven, Improved, Nos. 61 and 199. *Oliver Machinery Co., Grand Rapids, Mich.* [A. M. vol. 58, p. 816.]

In the improved machines the motor is mounted directly on the head, particularly for installations where a 3,600

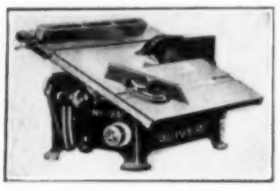
r.p.m. polyphase a.c. motor may be used. The rotor is mounted directly on the shaft of the cutter head or cylinder. The machine may be fur-

nished with belt-coupled drives for other motors. The bed is supported on square-thread screws with ball bearings. The cylinder carries thin high-speed steel knives clamped against hardened steel chip breakers. Four speeds for the work of 14, 18, 24 and 34 ft. per min. are available. There are four feed rolls, all driven by a train of heavy gears. Sectional feed rolls may be furnished. The No. 61 machine is made in two sizes, to plane material 24 or 30 in. wide and up to 8 in. thick. The smaller or No. 199 machine is also made in two sizes, for material 20 and 24 in. in width and 6 in. in thickness. Attachments can be furnished.

— 200 —

Saw Bench, Motor-Driven, 7-Inch, No. 193. *Oliver Machinery Co., Colbrook and Clancey Sts., Grand Rapids, Mich.* [A. M. vol. 58, p. 53.]

The bench is adapted to a wide variety of work. A special base can be provided, with knobs to aid in moving. The 21x24-in. table is grooved for the sliding cut-off gage, which may be used at either side of the saw and set to any angle. The table may be tilted up to 45 deg. The saw arbor runs on ball

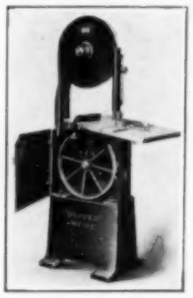


bearings and is driven by a ½-hp. motor. The yoke carrying the saw arbor is hinged so that the saw can be quickly raised or lowered by means of a hand lever. The driving motor, mounted on a swinging bracket, is provided with a turntable mechanism for raising and lowering to tighten the belt. Bench machine: height, 10 in.; weight crated, 200 lb. With floor base: height, 32 in.; weight crated, 300 pounds.

— 201 —

Sawing Machine, Band, Portable, 18-Inch, No. 192. *Oliver Machinery Co., Grand Rapids, Mich.* [A. M. vol. 58, p. 355.]

The wheels are 18 in. in diameter and there is an 18 in. capacity between the saw and the column. The machine is ball bearing throughout. It is portable and the belt-driven machine can be converted into a motor-driven machine at any time. The motor can be driven from an ordinary lamp socket. The table can be tipped 45 deg. The machine will rip up to 11 in. wide and will crosscut and miter up to 8 in. The moving parts are well covered



with steel guards. The ball-bearing motor is of ¼ hp. and runs at 1,800 r.p.m. Attachments can be furnished.

— 202 —

Sawing Machine, Band, Motor or Belt-Driven. *Little Giant Co., Mankato, Minn.* [A. M. vol. 58, p. 608.]

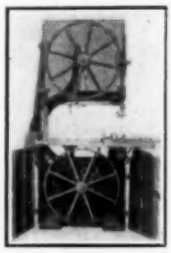
The machines are made in four sizes having wheels from 12 to 48 in. in diameter. All working parts are fully enclosed. The upper wheel is spring mounted and adjustable to suit the blade length. The table can be tilted 45 deg. outward. Roller guides are provided above and below the table to guide the saw blade. The machine is equipped with S. K. F. self-aligning ball bearings throughout. Motor and belt driven machines can be changed from one type to another. A ¼-hp. motor drives the model A machine illustrated. The machine occupies a floor space of 15x20 in., has a height of 60 in. and

weighs 300 lb. It may be used as an attachment for, and driven from, the company's woodworking lathes and metal lathes.

— 203 —

Sawing Machine, Band, Direct Motor-Driven, No. 16. *Oliver Machinery Co., Grand Rapids, Mich.* [A. M. vol. 58, p. 639.]

The drive is by means of a motor mounted directly on the shaft of the lower wheel, which runs in two ball bearings. The motor is fully enclosed, but has an air gap running up into the column. The motor drive is particularly recommended when a 600 r.p.m., 2- or 3-phase, a.c. motor can be used. The table may be tilted 45 deg. to the right and 5 deg. to the left. There is a 36 in. space between the blade and column, while a 16 in. clearance is under the guide. The lower wheel is encased in iron doors, while the upper wheel has a heavy wire-mesh guard.



The wheels are 36 in. in diameter and rubber faced. Attachments can be furnished. Floor space, 48x60 inches.

— 204 —

Saw, Cut-Off, Woodworking, Underswing, High-Speed, No. 96. *Oliver Machinery Co., Grand Rapids, Mich.* [A. M. vol. 58, p. 968.]

The machine performs the same functions as a swinging cut-off saw suspended from either the wall or ceiling. It can cut off 2-in material up to 22 in. wide, or 4-in. material up to 16 in. wide. Either belt or motor drive can be utilized. Pressure on the treadle brings the saw forward. When the pressure is relieved, the saw immediately returns to its original position. The length of stroke is adjustable. The center section of the table is a casting 22 in. wide by 36 in. long by 33 in. high. The two extension tables are of hard maple fitted with two rollers each. For motor drive, either a 3-hp., 1,800 r.p.m. or a 5-hp., 1,200 r.p.m.

motor can be supplied. Floor space, 4x10 ft. Shipping weight, 1,000 to 1,300 lb. depending on whether belt or motor drive is supplied.

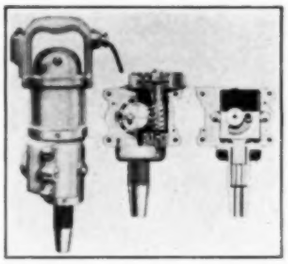
See Lathes, Special.

Small Tools

— 205 —

Hammer, Electric, Portable, Kron. *American Kron Scale Co., 430 East 53 St., New York, N. Y.* [A. M. vol. 58, p. 55.]

The motor of the device can be supplied for either 110 or 220 volts, to suit the type of current available. The hammer is intended for driving rivets up to ¾ in. in diameter, or drilling concrete with drills up to 2 in. in diameter. The reciprocating motion of the hammer is derived from the rotation of the eccentric pin on the worm-wheel geared to the motor. When the hammer is at the bottom of its stroke, the pin is disengaged from the hammer and does not receive any of the shock. None of the

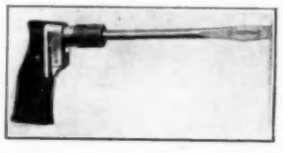


blow is transmitted through the mechanism to the motor. No matter how much pressure is placed on the hammer, the motor is not overloaded, but continues to run at the same speed. Length, 20 in. Weight, 26 pounds.

— 206 —

Screwdriver, Ratchet, Pistol-Grip, Hargrave. *Cincinnati Tool Co., Norwood, Cincinnati, Ohio.* [A. M. vol. 58, p. 129.]

The grip of the screwdriver is so shaped as to fit and not to tire the hand. It gives sufficient leverage to turn tight-fitting screws. Easy



running screws may be quickly turned by means of the knurled ferrule without taking the hand from the pistol grip. Blades of two widths and a reamer are regularly furnished with each tool. The blades can be changed without making adjustments on the tool, and may be had in 3, 4, 6, 8, 10 and 12 in. lengths.

— 207 —

Wrenches, Adjustable, Automatic, Gordon. *Automatic Wrench Co., 450 Palisade Ave., West New York, N. J.* [A. M. vol. 58, p. 238.]

In the adjustable monkey wrench shown at the right the head and the shank are made of one piece of drop-forged steel and riveted in the handle, which is a single

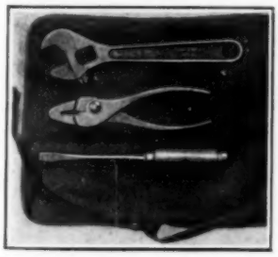
piece of drawn sheet metal without seams. The lower jaw is the movable one and slides on the shank of the upper. To adjust the opening of the wrench, the operator pushes the lower jaw in contact with the work with his thumb, in which position it stays. When the wrench is to be removed from the work, pressure on the releas-

ing catch at the top of the handle causes a small spring to pull back the lower jaw. In the pipe wrench at the left the lower jaw slides on a fixed post secured in the handle. The upper jaw is pivoted on the handle. The wrenches are made in 8, 10 and 14 in. sizes. An open-end wrench is also made. It can be adjusted to size by pressure on the adjustable jaw. Tightening can be obtained by turing the knurled thumbscrew. Release is by a downward pressure to draw the knurl out of contact with the teeth on the movable jaw. The tool is made in sizes of 6, 8 and 10 inches.

— 208 —

Tool Kit. *Crescent Tool Co., Jamestown, N. Y.* [A. M. vol. 58, p. 565.]

This kit consists of a wrench, pliers and screwdriver, and is intended for general use. The wrench is made of drop-forged steel, is 8 in. in length and has an adjustable head with a max-

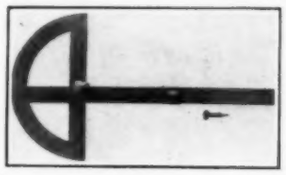


imum opening of $\frac{11}{16}$ in. The 6-in. pliers have a straight nose. The screwdriver is $7\frac{1}{2}$ in. in length with $\frac{5}{16}$ in. blade, and has a handle which may be swung and locked into position at right angles to the shank to give more leverage.

— 209 —

Drawing Instrument, Combination. *Golden Compa Co., Elkhart, Ind.* [A. M. vol. 58, p. 565.]

The instrument combines a protractor, T-square, rule and compass. The rule, pivot point and zero mark on the protractor are all in line, and

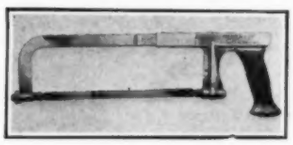


thereby make it possible to "short cut" many drawing operations. The protractor is graduated to $\frac{1}{2}$ deg.; the rule is 6 in. long. A compass is provided by the use of an adjustable pivot point and an adjustable slide on the rule that holds the pencil point. The pencil point is pressed down when drawing circles and angles and released for other work.

— 210 —

Hacksaw Frame, Morgan. *Albany Hardware Specialty Manufacturing Co., Albany, Wis.* [A. M. vol. 58, p. 644.]

The frame of this device is made to withstand severe strains without springing. Its features are the means



for the rapid releasing and tightening of the blade, quick adjustment to suit various lengths of blade, and a method of setting the blade to cut in any of four ways. The handle provides an easy grip for the operator.

— 211 —

Drawing Instrument, Combination, Blackboard. *Golden Compass Co., Elkhart, Ind.* [A. M. vol. 58, p. 781.]

The device combines a compass, rule, protractor and T-square, and is arranged with a vacuum cup pivot for holding the instrument on the board and allowing it to rotate freely. The rubber cup is claimed to hold the instrument in position from 10 to 15 minutes. The rule is 18 in. long and has holes for chalk at every inch. The protrac-

tor is graduated to 5 deg. divisions, and the T-square has a crossbar graduated to $\frac{1}{2}$ in. The zero point on the protractor is in line with the edge of the ruler. The instrument is adapted to school, shop and apprentice classrooms.

— 212 —

Pliers, Drop-Forged, Carlson. *Noble & Westbrook Manufacturing Co., Hartford, Conn.* [A. M. vol. 58, p. 820.]

The tool is adjustable to different sizes of pipes, bolts, nuts, caps and nipples, and is especially adapted for tightening or loosening such parts when they are in close quarters. The jaws are set at an angle to the handles. The capacity of the pliers ranges up to 1 in. on square and

$1\frac{1}{4}$ in. on round material. Either charcoal or gun-metal finish may be had. The device weighs $\frac{3}{4}$ lb. and has a length of 7 inches.

— 213 —

Dresser, Grinding Wheel. *M & S Manufacturing Co., P. O. Box 294, Hartford, Conn.* [A. M. vol. 58, p. 889.]

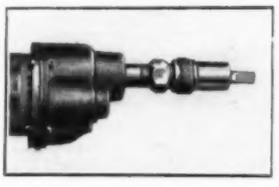
The tool is made in two sizes, with 1 in. and $2\frac{1}{2}$ in. abrasive wheels, respectively. The handle is made from a single piece of steel tubing, split at one end and formed in dies to the shape of the fork. The grip is knurled and the handle is nickel-plated. The bearings upon which the wheel runs are furnished by a ball-ended stud set permanently in one

side of the fork and a ball-pointed setscrew in the other. The wheel center is a steel bushing with deep conical centers, running upon the ball points.

— 214 —

Screwdriver Attachment, Portable Electric Drill, Thor. *Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.* [A. M. vol. 58, p. 890.]

The attachment consists of two main parts, one of which, the body, screws onto the drill spindle and revolves with it. The second part is the shank that carries the screwdriver by means of a knurled sleeve. The contacting ends of the parts are milled out to form a



clutch. When not held in engagement by the hand, the clutch is disengaged by a coil spring so that the blade is stationary. When screws are drawn up tightly, the clutch automatically releases. A bell-shaped finder can be furnished, to assist the operator in locating the slot in a screw head. The screwdriver attachment can be easily attached to or removed from the drill driving it.

— 215 —

Soldering Iron, Electric. *American Electric Heater Co., Detroit, Mich.* [A. M. vol. 58, p. 926.]

The iron is suitable for both light and heavy soldering operations where electric energy is available. By means of a non-conducting compression winding, the

heating element is kept in intimate contact with the core to prevent overheating of the element. The copper tip is of straight construction without an enlarged head. As the tip wears away, it can be withdrawn from the core. There is a polished nickel finish on all exterior metal parts and an ebonoid finish on the wooden handle. A 6-ft. cord and lamp socket attachment is supplied. Three sizes of the iron are available, with soldering tips $\frac{3}{8}$, $\frac{5}{8}$ and $\frac{7}{8}$ in. in diameter. The irons require 100, 200 and 300 watts, have an overall length of $12\frac{1}{4}$, 13 and $13\frac{3}{4}$ in., and weigh 18, 26 and 42 oz., respectively.

— 216 —

Truing Device, Crankpin, Hand-Operated. *R. G. Smith Tool and Manufacturing Co., 245 N.J.R.R. Ave., Newark, N. J.* [A. M. vol. 58, p. 92.]

The truing device is intended for turning the pins

on the crankshafts of automotive engines. The crankshaft need not be removed from the crankcase for the work. The device consists of a frame that carries the

cutter and that is turned about the pin by means of a lever. To true a pin, the lower half of the crankcase is removed and the connecting rod disconnected. The tool is applied by opening the frame, putting the frame in place on the pin and tightening the swing-bolt. A lever inserted in the holes in the periphery of the frame is used to rotate the tool.

— 217 —

Cutter, Circle, Metal, Hargrave. *Cincinnati Tool Co., Norwood, Cincinnati, Ohio.* [A. M. vol. 58, p. 129.]

The tool is intended for cutting circular holes in sheet metal, wood or fiber. The body of the tool is malleable iron, and the blades of tool

steel. Adjustment of the positions of the blades can easily be made after loosening the thumbscrews that lock them in position. Two models of the device are made, one with a center guide pin, and the other with a center drill for drilling holes. The capacity of both models is circles from 1 to 4 in. in diameter up to ⅞ in. deep.

— 218 —

Cutter, Fly-, Adjustable, Jiffy. *Paul W. Koch & Co., 19 South Wells St., Chicago, Ill.* [A. M. vol. 58, p. 167.]

The device is intended for cutting holes in fiber sheets, metal plates, or other work up to ⅛ in. thick. The body of the tool is made of malleable cast iron. It carries two

tool-steel cutters, either of which can be adjusted by loosening a nut. It is made in two sizes, the smaller one cutting diameters from 1¼ to 3 in. and the larger one diameters from 1½ to 6 in. The taper of the shank of the smaller tool is No. 2 Morse, and on the larger No. 3 Morse.

— 219 —

Reamer, Expansion, Helical. *Hanlon & Wilson, Wilkinsburg, Pa.* [A. M. vol. 58, p. 170.]

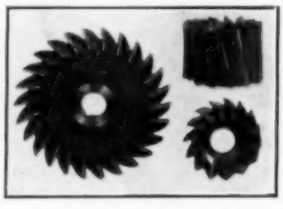
The tool is adapted to reaming holes containing oil grooves or cavities, and has a range of expansion of ⅛ in. It is made in diameters from ¾ to 1½ in., although larger diameters can be furnished. The central spindle or arbor is threaded in that portion of its length on which the blades are fitted. The arbor contains slots, the bot-

toms of which form a cone about the axis of the arbor. Keys or wedges are fitted in the slots. The segments having the helical cutting edges form a complete cylinder when assembled, with the exception of the portions removed when cutting them from the solid cylinder. The keys and the segments are interlocked. The diameter over the blades is varied by advancing the cutting sections lengthwise along the spindle by means of the adjusting nuts. Since the keys travel in the tapered slots, the diameter over the blades can be expanded or contracted.

— 220 —

Cutters, Milling, High-Speed, Standard. *Gorham Tool Co., Detroit, Mich.* [A. M. vol. 58, p. 275.]

The cutters are made from a selected grade of high-speed steel, and the heat-treatment is special. The de-

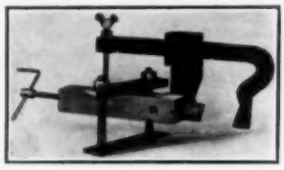


sign includes the features of the course-tooth type of cutter in a semi-coarse-tooth cutter. The number and spacing of teeth were determined by research to find the horsepower required to remove given amounts of stock under different conditions. The design provided for a large amount of chip clearance. The cutters are furnished in plain, side and end milling types in all standard sizes.

— 221 —

Toolholder, Cutting-Off, Lathe, Oddsen. *Reliable Machine Works, 42 Sixteenth St., Brooklyn, N. Y.* [A. M. vol. 58, p. 313.]

The holder is intended for use on a lathe when cutting-off round stock, especially when cutting short lengths of bar stock or pipe. The work is supported by the V's that are attached to the toolholder, and which perform the function of a steadyrest. The body of the tool consists



of a bar in which a cylindrical member is arranged to slide by the operation of the screw. The inner member carries the cutting off tool, which is of the standard ½ x ¾ in. size. The work-steadying member is adjustable to take diameters up to 5 in. The holder is secured to the toolpost of the lathe by a clamp. It is always fed by hand, with the cross slide of the lathe locked in position.

— 222 —

Tap, Staybolt, Spiral-Fluted. *W. L. Brubaker & Bros. Co., Millersburg, Pa.* [A. M. vol. 58, p. 675.]

The tap has spiral flutes for both the reaming and threading portions. The degree of taper is said to be just suited for the work and to increase the life of the tap about 20 per cent. The construction is such as to decrease vibration and its consequent breakage. The tap

has a free cutting edge. The relief employed is a compound relief consisting of the ordinary machine relief aided by a special machining operation. A steel of a special analysis has been developed. The tap is tempered so that there will be very little shortening or gain in the lead of the thread, at the same time giving the tool the proper cutting qualities and a soft center. The tap has 12 threads per inch, and is made in stock diameters from ¾ to 1½ in. and in stock lengths from 18 to 54 inches.

— 223 —

Reamer, Taper-Pin, Cutwell. *Wells Corp., Greenfield, Mass.* [A. M. vol. 58, p. 780.]

Instead of straight or left-hand helical flutes, the

helix is right-hand. The "lands" of the reamer are relief ground in the same manner as on a twist drill. It is claimed that this treatment eliminates any tendency of the tool to draw in, while the right-hand helix assures an easy shearing cut and carries the chips out at the large end of the hole. The reamer is made in all standard taper-pin sizes.

— 224 —

Drill, Twist, "Cle-Forge." *Cleveland Twist Drill Co., Cleveland, Ohio.* [A. M. vol. 58, p. 816.]

The drill is claimed to possess the advantages of both hotforged and milled drills. A hot-forged drill, while it has toughness, has a web which in many cases is not central because of the twisting process it has undergone when the flute was being formed. On the other hand, a milled drill, while not as tough as the forged, is used in far greater quantities because it has a centrally located web and is uniform in character, thereby producing more uniform holes. This drill is first hot forged to give toughness, and then it is machined in the same man-

ner as a milled drill to give accuracy and a centrally located web. The drill is made of high-speed steel and in a variety of sizes, with both tapered and straight shanks.

— 225 —

Center Drill, Reamer and Countersink; Inserted-Blade. *Frederick A. Wagner Co., Inc., Rochester, N. Y.* [A. M. vol. 58, p. 820.]

The device does in one operation the three operations required in putting center holes in work; namely, drilling, reaming and countersinking. The tool has an inserted blade or cutting member. It has a case-hardened mild steel body or holder, slotted to receive the blade. Four sizes are available, for centering shafts from ⅜ to 10 in. in diameter.

The blades are made of tungsten alloy steel and are blanked out with dies. The cutting lip and the drill point are hot-forged in a die, and then the blade is hardened, tempered and ground. Two 30-deg. beveled edges on the rear edge of the blade are used as a means of centering the latter in the holder.

— 226 —

Reamer, Chucking, Machine, Expansion. *Davis Boring Tool Co.*, 3718 *Forest Park Blvd., St. Louis, Mo.* [A. M. vol. 58, p. 969.]

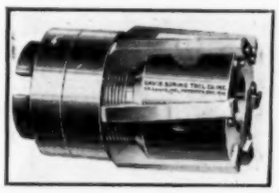
This reamer was designed for use on production in shops where a tool of moderate price is desirable. The blades project and cut in advance of the body, and are firmly held in place by hardened and ground taper

pins, so placed as to make line contact in grooves running longitudinally along the blades. The blades are moved forward for expansion by a nut near the rear of the body, and they slide on tapered seats. After the proper size has been attained, the nut is locked in position by a locknut at its rear. Reamers can be furnished with either straight or taper shanks and in sizes from ⅛ to 3½ in. The blades can be adjusted to cut oversize from 0.019 in. in the ⅛-in. size to 0.184 in. in the 3½-in. size.

— 227 —

Reamer, Expansion, Helical. *Davis Boring Tool Co.*, 3718 *Forest Park Blvd., St. Louis, Mo.* [A. M. vol. 58, p. 969.]

In adjusting the blades, they are moved either forward or back by a hardened nut at the rear, the blades sliding on tapered seats. After adjustment has been made, the nut is locked in position by a hardened locknut. The blades are held in the body by hardened and ground taper pins, so placed as to make line contact in

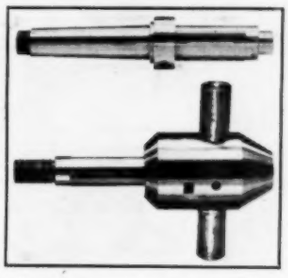


grooves running lengthwise of the blades. It is not necessary to loosen the taper pins when adjusting the blades. The reamer is of the shell type and can be furnished with blades set in right-hand, left-hand, or in a combination of right and left-hand helices, and in sizes ranging from 1⅛ to 7 in. The number of blades varies from 6 to 12.

— 228 —

Mandrels, Self-Gripping, Special "Ettco." *Eastern Tube & Tool Co., Inc., Brooklyn, N. Y.* [A. M. vol. 58, p. 126.]

The mandrel has three grooves, each containing a small hardened steel roller held in place in the gripping position by means of a flat spring. The diameter over

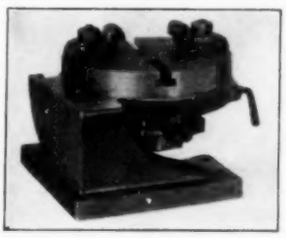


the rollers can be varied by shifting them in the slots. The work cannot be turned in one direction on the mandrel while the cut is being taken, but by twisting it in the reverse direction, it is released. The mandrel shown at the top is equipped with a taper shank and the one at the bottom with a threaded end. Special mandrels to fit Lo-Swing, Fay and other automatic lathes and engine lathes can be furnished as aids for holding work.

— 229 —

Angle Plate, Universal. *Coats Machine Tool Co.*, 108 *West 40th St., New York, N. Y.* [A. M. vol. 58, p. 639.]

The device is for use on milling and drilling machines, and is especially adaptable for holding and indexing circular work. It has a

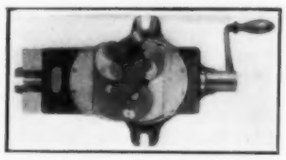


rotatable cast-iron faceplate 6 in. in diameter provided with T-slots. A ¾-in. central hole is provided and plugs are furnished for centering work. The plate is graduated and may be locked in any position of rotation. Steel indexing plates, which are mounted below the faceplate, are supplied in six sizes having from 12 to 360 divisions. A graduated swivel enables the axis of the faceplate to be set and locked at an angle about a horizontal axis. The complete unit can be fastened to the machine table by means of clamps and bolts, which are shown mounted on the angle plate itself.

— 230 —

Vise, Machine, Multiple Adjustable Jaws, Mantle. *Montrose Newman, Inc.*, 342 *Madison Ave., New York, N. Y.* [A. M. vol. 58, p. 644.]

The vise is intended for holding parts having irregular form. Both the movable and the sliding jaws carry sets of multiple jaw members that can automatically adjust themselves to the shape of the work. The adjustable members are semicircular in shape; there are four sizes and each member except those touching the work is fitted to receive two smaller ones. The mating jaws are dovetailed into each other. The body of the vise is of cast iron; the spindle and all of the jaw parts except the smallest are chrome-nickel steel. The smallest jaws, which touch

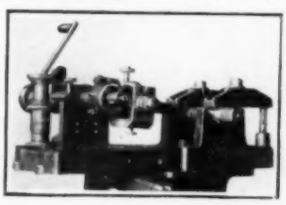


the work, are made from oil-hardened tool steel. The jaws are 4¾ in. wide and provide a maximum opening of 4½ in. The vise can be fitted with a graduated swivel base or a plain base. It has an overall length of 13 in. The use of the vise eliminates the need for special vise jaws and fixtures to suit each part, particularly for first-operation work.

— 231 —

Holding Device, Connecting Rod. *E. P. Campbell*, 238 *N. El Dorado St., Stockton, Cal.* [A. M. vol. 58, p. 644.]

The device is for holding automotive connecting rods while reaming or boring the bearings to size. It is shown mounted on a Sawyer-Weber connecting rod machine. It enables rapid setting up and location of the rod, but without deforming or twisting it. When setting up to bore the large bearing, the small bearing is centered and held on the bar at the right. Cones are put in the large

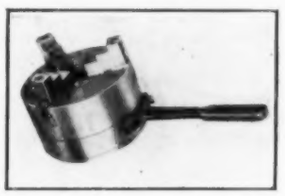


bearing to properly position it. The rod is then clamped into position and the centering cones removed. The bearing can then be bored to size. For rebabbitting work the rod is first set up by means of the centering cones then removed and babbitted. When replaced in the fixture it is properly held for reboring.

— 232 —

Chuck, Wrenchless, Improved, Foster-Barker. *Foster Machine Co., Elkhart, Ind.* [A. M. vol. 58, p. 677.]

The chuck is double acting and will grip both externally and internally. The improvement eliminates the use of springs for returning the jaws when releasing. The action is obtained by employing grooved cams instead of cams with external lobes only. The chuck can be opened and closed while in motion. The rear casing is kept stationary, although the body of the chuck is revolved by means of the lathe spindle. The position of the jaws can be adjusted by the lever mounted on the ring, the action taking place through two sets of planetary gears. Both three-jaw, and two-jaw types of chuck are available. The former type is made in seven sizes ranging from 6 to 21 in. in diameter and

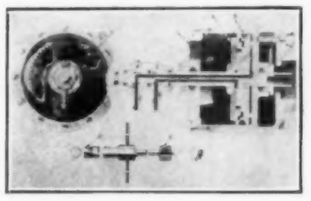


weighing from 29 to 400 lb. The latter is made in five sizes ranging from 6 to 15 in. in diameter and weighing from 27 to 160 pounds.

— 233 —

Air Cylinder, Style-H, M.E.C. *Manufacturers' Equipment Co., Waller Ave. and Fillmore St., Chicago, Ill.* [A. M. vol. 58, p. 715.]

The cylinder is for operating air chucks, such as used on drilling machines for clamping the work. The construction permits adjustments to be made without dismantling the cylinder. The features here included in the Style-H cylinder are applicable to other air cylinders manufactured by the company. An internal ring gear is threaded to screw on a shoulder on the piston. The teeth on a pinion can be meshed with the teeth of the gear after a plug has been removed from the cylinder

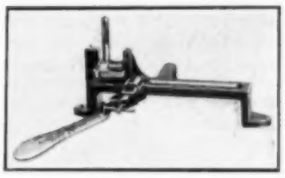


head. The pinion is then turned to compress the packing in the periphery of the piston and prevent leakage past it.

— 234 —

Compressor, Valve Spring. *American Tool Co., 10 Pleasant St., Pawtucket, R. I.* [A. M. vol. 58, p. 91.]

The device is for use in repairing automotive engines for placing the valve spring in position when re-assembling the motor. It consists of a compressor and a clip. The valve spring is placed in the compressor, and the long handle is pulled until the spring is compressed. The clip is then placed over the spring, and the cross handle of the compressor turned until the spring is relieved and can be lifted from the device. After the key has



been placed in the valve stem of the motor, the valve spring in its clip is brought to bear on the key and the handle is pressed down. The clip can then be easily removed, leaving the spring in place.

— 235 —

C-Clamp, Hargrave. *Cincinnati Tool Co., Norwood, Cincinnati, Ohio.* [A. M. vol. 58, p. 125.]

The clamp is intended especially for automobile body and pattern work where a greater reach is required than that given by the or-

dinary C-clamp. The steel screw is cut with a deep Acme thread. It can be furnished with either an end button or a ball-and-socket oscillating tip. The frame is of I-section, strong enough to withstand any force that can be exerted when screwing the clamp by hand. The clamps are made in 3, 4, 5 and 6 in. sizes with 2⅝, 2½, 3 and 3⅝ in. throat depths, respectively.

See Measuring, Gaging and Testing Equipment.

Miscellaneous Equipment and Supplies

— 236 —

Countershaft Multiple Friction-Disk. *Warner & Swasey Co., Cleveland, Ohio.* [A. M. vol. 58, p. 89.]

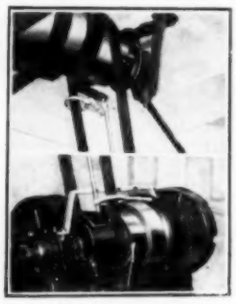
The countershaft is equipped with clutches having multiple friction disks, similar to the clutches employed in automobile construction. The clutches are adapted to high-speed manufacturing work, such as

encountered in machines finishing brass and bronze parts where starting, stopping and reversal occur often. Hardened steel plates are employed in the clutch members. The countershaft is applicable to all makes of lathes and machine tools. It has pulley diameters of 10 and 12 in. and widths of face of 3½ and 4¼ in., respectively. Shaft lengths, 4 ft. 4 in. and 5 ft. Weights, with countercone, 285 and 335 pounds.

— 237 —

Belt Shifter, Cone-pulley. *G. A. Reeve, 916 Hill St., Middletown, Ohio.* [A. M. vol. 58, p. 781.]

The shifting movement is very similar to that used by a mechanic in shifting cone-pulley belts by hand. In shifting the belt when in the position shown, the operator first swings the handle to the left, which runs the belt off the countershaft pulley and

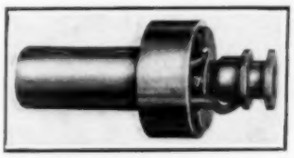


down onto the next step. He then places the vertical rod in the next notch on the bar over the lathe cone and swings the handle to the right, which puts the belt on the next larger step. The shifter is made in various sizes and styles to fit any machine using a cone-pulley drive. It weighs about 25 lb., and drilling and tapping are the only operations needed to put it in place.

— 238 —

Clutch, Friction, Expansion. *Conway Clutch Co., Cincinnati, Ohio.* [A. M. vol. 58, p. 814.]

The clutch is for geared-head lathes and other single-pulley-drive machines making speed change by means of gears. When released the

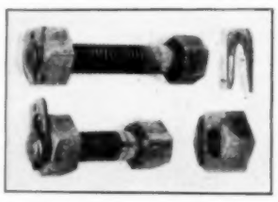


friction band springs free from the drum and is held tightly concentric to the shaft by means of a guide machined on the periphery of the carrier. This action provides a space of 0.01 in. between the friction band and the drum at all points when the chuck is released. A large lever ratio is provided in the operating mechanism, which reduces the force required for shifting. The clutch is adjusted by means of one screw.

— 239 —

Locknut, Safety, Rose-Albin. *Specialty Manufacturing and Sales Co., 171 Lexington Ave., Brooklyn, N. Y.* [A. M. vol. 58, p. 128.]

The device does not require that a hole be drilled through the bolt in order to secure it. The nut proper has a slot in the top of it, in which can be fitted a clip or pin. After the clip is

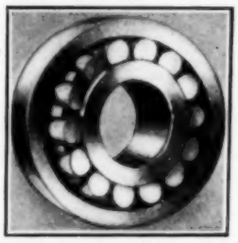


slipped in place on the nut, the two ends of the fork are pinched around the thread of the bolt. The nut cannot be taken off the bolt while the clip is in place, without actually destroying the thread. The nuts can withstand vibration as well as twisting strains without loosening. They can be furnished in all standard sizes.

— 240 —

Roller Bearing, Spherical-Type. *S.K.F. Industries, Inc., 165 Broadway, New York, N. Y.* [A. M. vol. 58, p. 276.]

The bearing contains two rows of rollers, each of which has convex sides so that its periphery is curved in two planes. The outer race is ground spherical over its inner surface so that it can be slipped over the rollers as shown. The inner race has two concave surfaces in which the rollers fit and make contact for their full length. Between these surfaces is a guiding flange. The shapes of the parts and the actions of the forces cause the inner ends of the rollers to bear against the flange, which then maintains them with their axes parallel to that of the shaft. The retainer rings serve only to separate the rollers. The bearing has a radial load capacity about twice that of a ball bearing of corre-



sponding size, and can carry considerable thrust load. It is self-contained and self-aligning.

— 241 —

Bearings, Machine, Standard, Chadwick. General *Aluminum & Brass Co., Detroit, Mich.* [A. M. vol. 58, p. 314.]

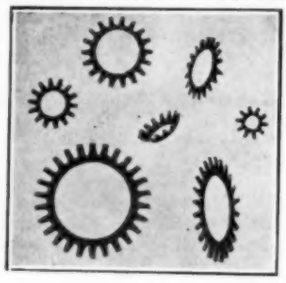
The bearing consists of a bronze back with a lining of

babbitt, held together with a thin bond of tin. The bronze has the strength to withstand the hammering and vibration to which the bearing is subjected, together with excellent heat - conducting qualities. The value of the babbitt lining lies in its anti-friction qualities. Also it will melt and flow when overheated, and not seize the shaft. The bearing surfaces are held within 0.00025 in. of specified dimensions to make the bearing interchangeable. The bearing surface is finely burnished and is stated to be so accurate that reaming, running-in or hand scrapping is undesirable.

— 242 —

Washers, Lock. *Shakeproof Screw & Nut Co., 400 N. Michigan Ave., Chicago, Ill.* [A. M. vol. 58, p. 565.]

The washers will lock screws and bolts of any ma-



terial from aluminum to tempered steel and are intended for use where excessive vibration takes place. They are made of clock-spring tempered steel and are rust-proofed. The flat washers range in size from ⅛ to ¾ in. nominal inside diameter and have from 10 to 32 locking struts. These struts or teeth are set at an angle of 45 deg., and under pressure they tend to flatten to about 20 deg. Countersunk washers of the type shown in the center of the illustration are also made for locking screws with countersunk heads.

— 243 —

Bushings and Liners, Jig and Die, Standard. *Kenosha Die & Stamping Works, Kenosha, Wis.* [A. M. vol. 58, p. 891.]

These standard jig liners and shoulder bushings are for use in jig and die construction. The sizes of the bushings correspond to standard drill, tap drill and reamer sizes, although special sizes can be furnished. The standard sizes of the liners range from ⅛ in. hole diameter x ⅛ in. outside diameter x ⅜ in. long to 3x3⅜x4 in.; and the standard bushings range in size from ⅛x⅛in. to 2½x3¼x5¼ in. The bushings are made of tool steel, hardened and ground.

— 244 —

Pulley Covering, Fabric. *Monarch Belting Co.*, 1270 *Ontario St., Cleveland, Ohio.* [A. M. vol. 58, p. 312.]

The covering is intended as a means of reducing the slippage of belts on pulleys. It consists of a duck that is treated with a preservative material, and then cemented to the face of the pulley by a special cement. The covering is laid on in a single thickness with a closely fitting butt joint at the junction of the ends. The surface of the pulley must first be properly cleaned. The cement is applied cold and hardens overnight. It is suitable for use when cementing cloth disks on metal wheels of disk grinders. No non-slip preparations are placed on the belt.

— 245 —

Bronze, "Ampco." *American Metal Products Co., 34th Ave. & Burnham St., Milwaukee, Wis.* [A. M. vol. 58, p. 674.]

The bronze is made in several grades and is intended for use in the manufacture of metallic packing, bearings, bushings, gears, worms, valves and fittings, pickling equipment, chemical apparatus and the like. The grades are said to vary in hardness from a very soft bronze to one that is harder than chrome-nickel steel, the latter grade being practically non-machinable. The metal is from 5 to 20 per cent lighter than ordinary bronze and is 3 per cent lighter than steel. It ranges in hardness according to the grade from 15 to 55 Shore scleroscope reading. The metal can be cast, forged, rolled or drawn. In the harder grades it is said to be extremely resistant to the action of most commercial acids and alkalis. Its heat-resisting qualities adapt it for uses such as automotive poppet valves. It is readily machinable in all grades except the hardest.

— 246 —

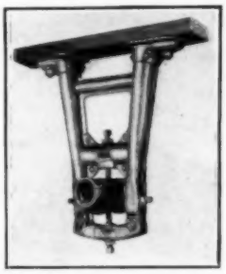
Micarta, Small Gear, No. 238. *Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.* [A. M. vol. 58, p. 678.]

This grade of Micarta is for use in the manufacture of gears and pinions of small pitch and face width, such as are used in phonographs and magnetos. It is made from a good grade of fine fabric and, because of its densely homogeneous structure, can be machined very accurately. For this reason it is adaptable to fine-pitch applications, particularly in small motor - operated machines, where the gears must run silently with a high operating efficiency.

— 247 —

Hanger, Shafting, Pressed-Steel. *American Pulley Co., Philadelphia, Pa.* [A. M. vol. 58, p. 961.]

The hanger is made in regular drop sizes from 7 to 24 in., and for all shaft sizes up to 3 in. The main frame is constructed of two stampings placed face to face, with inturned flanges extending the entire length of the leg, and the cross brace is integral with the legs. The feet are made of cold-drawn, seamless metal and are riveted to the legs. The hanger is of the parting variety, with a swing yoke that permits removing

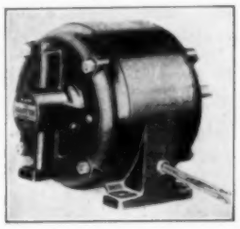


quickly the shaft or bearing. Four setscrews hold the bearing in place. A babbitted bearing box is employed. The castings of the box are heavy, and provided with large oil reservoirs.

— 248 —

Motors, Electric, Small. *Master Electric Co., Dayton, Ohio.* [A. M. vol. 58, p. 128.]

The motors are made in sizes from ⅛ to 1½ hp. The construction of the frame is the same at the commutator end as on the end from which the shaft projects. The frames are interchangeable for a.c. or d.c. use. Other

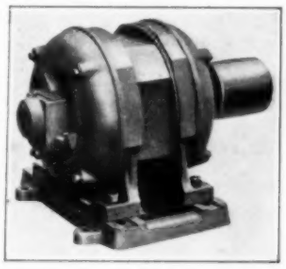


features are the compact short-circuiting device, the removable self-aligning phosphor-bronze bearings and the dual wick-oiling system. Induction motors for single-phase and polyphase a.c. circuits can be furnished, while compound-wound motors are made for d.c. use. Motors up to 2 hp. for high-speed work, and as small as ⅛ hp. can be supplied.

— 249 —

Motor, Heavy-Duty, Squirrel-Cage, A. C. *Louis Allis Co., Milwaukee, Wis.* [A. M. vol. 58, p. 205.]

The motor is for operation on polyphase alternating current. It differs from the standard design principally in the construction of the



rotor. The windings of the rotor consist of a single sheet of copper punched and formed by a special process. The winding is wrapped around the core and the copper bars are then expanded into the core slots by swaging. The single joint in the winding on the two end rings is silver-welded, and the rings contracted by a special operation. The shaft is usually mounted in bronze bearings, but ball bearings can be supplied. The motor is guaranteed to carry its full rated load continuously with a temperature rise not exceeding 40 deg. C. above the surrounding air. It is ordinarily mounted on a base by which it can be moved backward and forward. Back-gears can be fitted. The motors are made in sizes from 1 to 10 hp. and in the standard speeds.

— 250 —

Light, Electric, Floor, Garage. *Manley Manufacturing Co., York, Pa.* [A. M. vol. 58, p. 238.]

The device is intended especially for use in garages to enable the mechanic to throw light on any part of the automobile on which he is working. The base is 14 in. in diameter. The main column is telescoping and can be raised to a height of 60 in. The arm can be placed in any position and clamped; for work underneath the chassis it can be swung downward. At the top of the stand there is a socket from

which a portable electric drill or a trouble light can be supplied with current. A heavy, rubber-covered cable 25 ft. long is supplied. The reflector is made of enameled steel and equipped with a guard for the lamp. The fittings are waterproof throughout. The weight of the base holds the stand rigidly in position.

— 251 —

Motor-Generator Set, Battery-Charging, Low-Voltage. *Ohio Electric & Controller Co., 5900 Maurice Ave., Cleveland, Ohio.* [A. M. vol. 58, p. 463.]

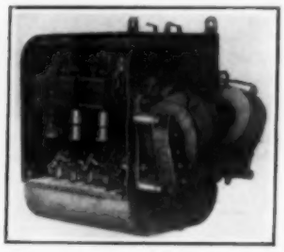
The set is intended particularly for charging storage batteries such as used on automobiles and radio sets. It is designed for 6- to 12-volt batteries and consists of a ball-bearing low-voltage d. c. generator and a motor wound for a. c. current. The motor and generator are connected by a flexible coupling.

An ammeter and rheostat are provided with which to regulate the charging rate, which varies from 1 to 20 amperes. The set is simply and easily operated and runs with comparative silence.

— 252 —

Starter, Squirrel-Cage Motor, Automatic. *Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.* [A. M. vol. 58, p. 605.]

This automatic "autostarter" is for use in starting squirrel-cage induction motors such as commonly used for machine drives. The tank enclosing the contacts can be dropped to permit of inspection. Taps are pro-

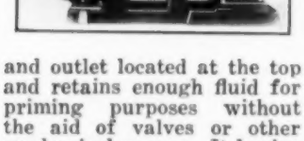


vided on the coils for adjusting the starting voltage and, consequently, the starting torque. The contacts are of the rolling type. They are actuated by a dual magnetic mechanism to open and close them at the proper times. The run magnet also functions as a low-voltage relay. The control relay is given a definite time limit by means of a dash-pot so that the time of starting a motor may be adjusted for any period up to 15 sec. The starter is operated either by a master switch or by push buttons for remote control. Overload protection on all phases is provided.

— 253 —

Pump, Centrifugal, Motor-Driven, Ball Bearing. *Fulflo Specialties Co., Blanchester, Ohio.* [A. M. vol. 58, p. 388.]

This self-priming centrifugal unit is for pumping liquids such as coolant compounds, oils, brines and enamel. It is of 75 gal. capacity. It has both intake

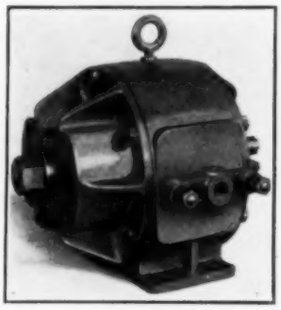


and outlet located at the top and retains enough fluid for priming purposes without the aid of valves or other mechanical means. It begins pumping the instant the machine is started. The free-floating impellers and anti-clog features expel chips without harm to the pump. The pump will deliver from a few drops per minute to full capacity, depending on the regulation.

— 254 —

Pump, Rotary, Hydraulic, High-Pressure, Hele-Shaw. *American Fluid Motors Co., 2414 Aramingo Ave., Philadelphia, Pa.* [A. M. vol. 58, p. 853.]

The pump can be used for supplying oil under pressure to presses, cranes and testing machines, and fuel oil to burners. It is claimed to maintain a constant pressure at all times, while automatically varying the supply from zero to the full capacity. The cylinder body is mounted on and rotated about a central hollow shaft, which is the valve of the pump and contains the inlet and exhaust ports. The cylinder body holds several radial cylinders, in each of which a plunger operates. The plungers are fastened to a gudgeon pin, which engages in a groove of the "floating ring." The extent to which the floating ring is shifted from the center determines

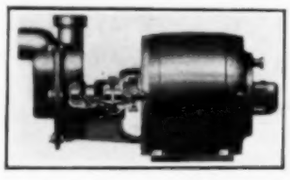


the length of stroke and, accordingly, the volume of fluid delivered. The pumps are built in capacities ranging from 3 to 110 gal. per min. maximum discharge, and with maximum pressures ranging from 3,500 to 2,200 lb. per sq.in., respectively.

— 255 —

Pump, Coolant, Centrifugal, Motor-Driven. *Arrow Pump Co., Buhl Building, Detroit, Mich.* [A. M. vol. 58, p. 856.]

The pump is primarily intended for circulating the cutting lubricant to cutting tools in machine shops, since its construction is such as to resist the injurious effects of abrasives present in coolants. The pump has only one working part, the impeller. A priming chamber enables it

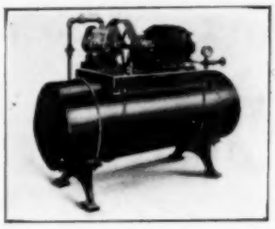


to retain its prime automatically. The construction prevents the liquid being pumped from coming in contact with the bearings, and provides a positive supply of oil to the bearings by means of the ring oilers. The unit is capable of supplying a group of machines from a central supply. It requires no base and is suitable for either floor or side wall mounting.

— 256 —

Compressors, Air, Automatic, Dunning. *George Sachsenmaier Co., 926 North 3rd St., Philadelphia, Pa.* [A. M. vol. 58, p. 389.]

The cylinders, oil reservoir and base are in a one-piece casting. The ends of the cylinders are covered with removable cylinder heads and hold the valves, which are of



steel bearing against cast-iron seats. A long, double, one-piece piston is operated in both cylinders by means of a hollow eccentric shaft. Three piston rings at each end of the piston prevent the loss of compression. Complete electric-driven compressor units are made in various sizes. Model A size is a ½-hp. unit and will develop 150 lb. per sq.in. pressure; Model B has a ½-hp. motor, for 200 lb. pressure; and Model C is a ¾-hp. unit for 250 lb. pressure. The automatically controlled tank units shown are made in two sizes. The tanks are tested to withstand 400 lb. unit pressure.

— 257 —

Compressor, Air, Direct-Connected, Small. *Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.* [A. M. vol. 58, p. 462.]

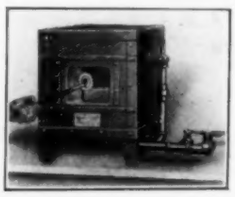
The compressor can be run at high speed and directly connected to an electric motor

or internal combustion engine. It is of the vertical, duplex, single-acting, water-cooled type, and is fitted with Simplate flat disk inlet and discharge valves. The machine is built in three sizes, having piston displacements of 128, 160 and 210 cu.ft. per min. Each is suitable for a working pressure of 150 lb. per sq.in. and a speed of 600 r.p.m. If an intermittent supply of air is required, the motor can be furnished with an automatic starter. The water control valve is operated by air pressure. The complete unit is automatic in every way, as it controls the electric current, air delivered, circulating water and lubrication.

— 258 —

Furnace, Gas, Heat-Treating, "Midget Universal." *Fitzgerald Forging and Heat-Treating Co., 576 St. James Ave., Springfield, Mass.* [A. M. vol. 58, p. 54.]

The furnace is suitable for heat-treating both high-speed and carbon tool steels. At the front of the furnace is a space 4 to 6 in. wide and 4¾ in. deep where tools may be pre-heated to approximately 1,500 deg. F. before being placed in the heated chamber. Only 275 cu.ft. of gas are required per hour to maintain a temperature of 2,400 deg. F. Complete combustion is claimed, with the absence of scaling, pitting or wasting away of the work. The furnace is fitted with four burners. The roof of the heating chamber is arched to prevent the formation of cold pockets. There is provision made at the rear of the furnace for inserting a pyrometer couple. A removable

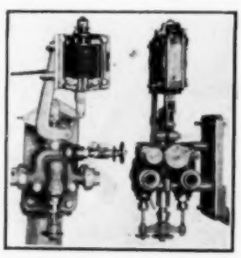


plug at the rear allows for heating long tools. Chamber: width 6½ in.; height, 7 in.; length, 9 in.; opening, 4x4¾ inches.

— 259 —

Control, Temperature, Automatic, Oil Furnace. *Combustion Control Co., Otis Bldg., Philadelphia, Pa.* [A. M. vol. 58, p. 350.]

This temperature and pressure controller is to be used in connection with heating and heat-treating furnaces where oil is employed as fuel. It is of the solenoid-operated



type with constant stroke. The dual control and adjustment mechanism is mounted on a central housing and consists of two separate bodies,

one for oil and the other for air or steam. Each of these bodies has an independent by-pass and auxiliary regulating valve. A vertical shaft operates the auxiliary valves to control the admission of the fuel oil and the air or steam for atomization. The temperature indicating and control pyrometer is first set at the desired point. The mechanism then operates to keep the temperature within close limits. The control can be operated in conjunction with any of the standard pyrometric controllers, such as are used for signalling by bells or colored lights.

— 260 —

Generator, Acetylene, Welding, Portable. *Alexander Milburn Co., 1416 West Baltimore St., Baltimore, Md.* [A. M. vol. 58, p. 463.]

The generator provides a source of acetylene gas for use in oxy-acetylene welding,

without the use of cylinder containing gas at high pressure. It has a capacity for 30 lb. of carbide, which is equivalent to 150 cu.ft. of cylinder gas. It has a steel body welded throughout, weighs approximately 200 lb. and is 5 ft. 3 in. over-all. The diameters of the bottom and top are respectively, 24 and 12 in. The generator is simple to operate, has few parts, and no clocks nor motors are needed, because the operation is automatic.

— 261 —

Blow Torch, Gasoline, "Master," No. 44 A. *Turner Brass Works, Sycamore, Ill.* [A. M. vol. 58, p. 532b.]

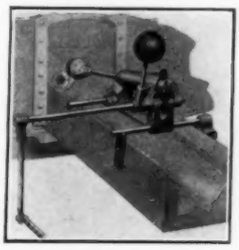
The torch has a number of special features, such as a safety valve, only one opening in the tank, two sources of air supply and the separation of the shut-off valve from the fuel-control valve. The safety valve at the end of the pump cylinder gives way automatically at 40 lb. air pressure. The pump is equipped with a leather washer on the piston. The fuel passes through a solid bronze baffle called the "hot spot hump," the heat of which vaporizes the fuel. Air is admitted from two sources. One is through a flared inlet in front of the needle valve; the other a long slot at the top of the burner tube. Separate shut-off and fuel control valves are provided. The needle valve has a thumb-and-finger

control to prevent the operator from exerting enough pressure to enlarge the orifice. The torch is built in a variety of sizes and types.

— 262 —

Cupola Tapper and Stopper, Foundry, Safety. *Medart Co., Potomac and DeKalb Sts., St. Louis, Mo.* [A. M. vol. 58, p. 314.]

The device is for controlling the molten metal from a cupola in a foundry. It is attached to the spout of the cupola and carries a ball of special composition that fits in the tap hole to stop the flow of the metal. Opening and closing the tap hole is accomplished by moving the lever at the left. The safety of the operator and of the workmen around the cupola is considerably enhanced. Since the device is hinged, it



can be lifted and swung to one side so as to leave the spout absolutely clear. The breast of the cupola is filled with fire clay in the usual manner. One ball should last for four to six heats. The link mechanism is such as both to raise and to draw back the piston rod when the cupola is to be tapped.

— 263 —

Sifting Machine, Sand, Electric-Driven, Portable. *Lowe Manufacturing Co., 6063 Wabash Ave., Detroit, Mich.* [A. M. vol. 58, p. 818.]

The machine is for use in the foundry operation of screening core and molding sand. A ½-hp. G.E. motor of either a.c. or d.c. type and 110 or 220-volt capacity is bolted to the steel side bars at the top of the machine. The flywheel into which the motor shaft is fitted runs on the same center as the latter. It has a double row of Hess-Bright ball bearings on its lower side which are ⅛ in. off center and hold the upper end of the main shaft. A 2-in. ball supports the lower end of the main shaft, but allows a 14-in. clearance over the riddle for shoveling. When the riddle is in operation the upper end of the main shaft moves in a circular path ⅛ in. off center,

the riddle moving similarly. The machine makes 1,725 gyrations per min. holding a 20-in. wooden-rim riddle. Weight, 125 pounds.

— 264 —

Marking Machine, Floor. *Hampden Supply Co., 45 Sharon St., Springfield, Mass.* [A. M. vol. 58, p. 749.]

The machine marks floors with paint at a speed as fast as man walks. Lines can be quickly made for aisles, safety zones and spaces where material is to be piled on factory floors. It is claimed that the machine will mark close to posts and walls. The frame is made of one piece of angle iron and mounted on 5-in. malleable iron wheels having rubber tires. The paint container has a capacity of 6 quarts, and a hand lever controls the flow of paint. The marking pad can be furnished in any width desired, but is usually made for 2-in. lines. The

four wheels are lined up rigidly so that the machine will follow a straight line while being pushed. Weight, 50 pounds.

— 265 —

Sandblast Operator's Outfit, Apron and Hood, "Shotpruf." *Pangborn Corporation, Hagerstown, Md.* [A. M. vol. 58, p. 95.]

The clothing is especially resistant to wear, and has been developed particularly on account of the increasing use of steel shot and grit as an abrasive for sandblasting. The front of the apron is

made of chrome leather. The garment is held to the operator's legs by means of spring clips, and can be easily and quickly put on or removed. The hood is provided with a chrome-leather front and a crown that resists the wear of the abrasive. A finely woven wire screen that can be easily replaced protects the operator's eyes. The hood is made with an adjustable head band.

How to Use the Index of Manufacturers

THE contents page preceding the review pages is useful for locating a particular type of machine or appliance, the products being grouped according to type.

If it is desired to find what developments have been made by a certain concern, the following pages will be of value, as they give an index of the manufacturers for whom new products have been described in the *American Machinist* during the past six months. The index serves to show the activities of manufacturers in bringing out new products, as it offers a résumé of the developments occurring during the six-month period.

In the index, the names of the manufacturers are placed in alphabetical order, and under the name of each can be found the product or products treated in the review pages. The number of the page on which the story appears is given to aid in finding the location of the article. The number of the item is placed after each product to make locating rapid.

The condensed descriptions and illustrations are intended to give the reader a good general idea of each product. For further details the description appearing in Vol. 58 of the *American Machinist* on the page referred to at the head of each item, should be consulted.

Index of Manufacturers

	No.	Page
Acme Machine Tool Co., Cincinnati, Ohio		
Universal flat turret lathe	70	94
Universal turret lathe	72	94
Adriance Machine Works, Inc., Brooklyn, N. Y.		
Horning and wiring press	110	100
Albany Hardware Specialty Mfg. Co., Albany, Wis.		
Hacksaw frame	210	113
Albertson & Co., Sioux City, Iowa		
Flexible shaft outfit	140	104
Allan Manufacturing & Welding Co., Buffalo, N. Y.		
Portable internal grinder	34	89
Allis, Louis, Co., Milwaukee, Wis.		
Heavy-duty motor	249	117
American Electric Heater Co., Detroit, Mich.		
Electric soldering iron	215	113
American Engineering Co., Philadelphia, Pa.		
Mono-rail electric hoist	194	111
American Fluid Motors Co., Philadelphia, Pa.		
High-pressure hydraulic rotary pump	254	118
American Grinder Co., Detroit, Mich.		
Spur gear grinding machine	29	89
American Kron Scale Co., New York, N. Y.		
Portable electric hammer	205	112
American Metal Products Co., Milwaukee, Wis.		
"Ampco" bronze	245	117
American Pulley Co., Philadelphia, Pa.		
Pressed-steel shafting hanger	247	117
American Tool Co., Pawtucket, R. I.		
Valve spring compressor	234	116
American Tool Works Co., Cincinnati, Ohio		
Radial drilling machine	11	86
Geared-head engine lathe	67	94
Ames, B. C., Co., Waltham, Mass.		
Dial gage	163	107
Anderson Die Machine Co., Bridgeport, Conn.		
Drilling attachment for tapping machine	22	87
Anderson, Hugold, Providence, R. I.		
Bench filing machine	139	104
Arrow Pump Co., Detroit, Mich.		
Coolant pump	255	118
Artos Engineering Co., Milwaukee, Wis.		
Cable measuring and cutting machine	138	104
Atkins, E. C., & Co., Indianapolis, Ind.		
No. 7A power hacksaw	150	105
No. 18 power hacksaw	151	105
Auto-Hone Co., Inc., Buffalo, N. Y.		
Automotive cylinder hone	58	92
Automatic Machine Co., Bridgeport, Conn.		
Threading lathe	124	102
Hobbing machine	127	102
Automatic Wrench Co., West New York, N. J.		
Adjustable wrenches	207	112
Automotive Maintenance Mchy. Co., Chicago, Ill.		
Automotive cylinder hone	60	93
Bacharach Industrial Instrument Co., Pittsbgh., Pa.		
Radiation pyrometer	185	110
Baker R & L Co., Cleveland, Ohio		
Electric elevating platform truck	186	110
Barnes Drill Co., Rockford, Ill.		
Gang drilling and tapping machine	121	101
Barrett-Cravens Co., Chicago, Ill.		
Hand-operated portable derrick	193	111
Bartlett, Edwin E., Nashua, N. H.		
Cam-operated arbor press	99	99
Bath, John, & Co., Inc., Worcester, Mass.		
Internal thread micrometer	175	108
Beaudry & Co., Inc., Boston, Mass.		
Rocking-face hammer die	111	100
Bethel-Player Co., Westboro, Mass.		
Fraser vertical lapping machine	55	92
Vertical lapping machine	56	92
Vertical ring lapping machine	57	92
Blacker Engineering Co., Inc., New York, N. Y.		
Power smithing hammer	142	104
Blanchard Machine Co., Cambridge, Mass.		
Automatic surface grinding machine	37	90
Brown & Sharpe Mfg. Co., Providence, R. I.		
Automatic milling machine	85	96
6-in. stainless steel rule	158	106
12-in. stainless steel rule	159	106
Dial test indicator attachment	164	107
Brubaker, W. L., & Bros. Co., Millersburg, Pa.		
Spiral-fluted staybolt tap	222	114
Bullard Machine Tool Co., Bridgeport, Conn.		
Hand feed levers for "Maxi-Mill"	5	85
Bultman, F. H., Co., Cleveland, Ohio		
Fatigue testing machine	180	109
Impact testing machine	181	109
Burke Machine Tool Co., Conneaut, Ohio		
Bench sensitive drilling machine	9	86
Campbell, E. P., Stockton, Calif.		
Connecting-rod holding device	231	115
Carroll, A. V., Machine Tool Co., Cincinnati, Ohio		
Motor-driven gap lathe	62	93
12-in. gap lathe	63	93
Chapman, P. E., Electrical Works, St. Louis, Mo.		
Commutator soldering machine	155	106
Chicago Pneumatic Tool Co., New York, N. Y.		
Small air compressor	257	118
Churchill Machine Tool Co., Ltd., Manchester, Eng.		
Internal grinding machine	33	89
Cincinnati Gear Cutting Machine Co., Cincinnati, Ohio		
Gear hobbing machine	144	104
Cincinnati Milling Machine Co., Cincinnati, Ohio		
Automatic milling machine	86	96
Cincinnati Planer Co., Cincinnati, Ohio		
30x30-in. open-side planer	91	97
72-in. open-side planer	93	98
Cincinnati Tool Co., Cincinnati, Ohio		
Pistol-grip ratchet screwdriver	206	112
Circle metal cutter	217	114
Hargrave C-clamp	235	116
Clark Trustractor Co., Buchanan, Mich.		
Lift-truck tote box	188	110
Cleveland Armature Works, Inc, Cleveland, Ohio		
Roller-bearing grinder	40	90
Cleveland Punch & Shear Works Co., Cleveland, Ohio		
Group mounting for punch presses	117	101
Spacing table for punch press	119	101
Power driven bending roll	133	103
Cleveland Twist Drill Co., Cleveland, Ohio		
"Cle-forge" twist drill	224	114
Cleveland Universal Jig Co., Cleveland, Ohio		
Quick-acting drill jigs	21	87
Clough, R. M., Meriden, Conn.		
Cylinder lapping machine	54	92
Milling machine with speed attachment	87	96
Crescent Tool Co., Jamestown, N. Y.		
Tool kit	208	113
Coats Machine Tool Co., New York, N. Y.		
Universal angle plate	229	115
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.		
Metal-parts washing machine	156	106
Combustion Control Co., Philadelphia, Pa.		
Temperature control for oil furnace	259	118
Con. Mach. Tool Corp., of America, New York, N. Y.		
Planer-type milling machine	88	97
Conway Clutch Co., Cincinnati, Ohio		
Friction clutch	238	116
Danly Machine Specialties Co., Chicago, Ill.		
Standard die-sets	112	100
Gage and stop for die-set	113	100
Type-Z die-set	114	100
Davis Boring Tool Co., St. Louis, Mo.		
Expansion machine reamer	226	115
Helical expansion reamer	227	115
Davis & Thompson Co., Milwaukee, Wis.		
Multiple-spindle boring and turning machine	2	85
Multiple-spindle horizontal milling machine	12	86
Detroit Machine Tool Co., Detroit, Mich.		
Cylindrical centerless grinding machine	25	88

	No.	Page
Diamond Machine Co., Providence, R. I.		
66-in. face grinding machine	27	88
Dorman, John H., West New York, N. J.		
Multiple-spindle drilling head	24	88
Eastern Machine Screw Corp., New Haven, Conn.		
Chaser regrinding machine	41	90
Eastern Tube & Tool Co., Inc., Brooklyn, N. Y.		
"Ettco" self-gripping mandrels	228	115
Efficiency Grinder Co., Madison, Wis.		
Electric tool grinder	46	91
Eleveyor Industrial Truck Co., Brooklyn, N. Y.		
Electrical elevating truck	187	110
Erie Foundry Co., Erie, Pa.		
Board drop hammer	143	104
Federal Products Corp., Providence, R. I.		
Dial indicators	165	107
Indicating cylinder testing gages	166	107
Dial gage hood	167	107
Micrometer dial gage	168	107
Thickness dial gage	169	107
Micrometer dial indicating gage	170	108
Dial comparator	171	108
Thread lead indicating gage	176	108
Fellows Gear Shaper Co., Springfield, Vt.		
Thread generator	125	102
Ferracute Machine Co., Bridgeton, N. J.		
Punching and shearing press	104	99
Fitzgerald Forging & Heat Treating Co., Springfield, Mass.		
Heat-treatment gas furnace	258	118
Foote-Burt Co., Cleveland, Ohio		
Vertical two-spindle drilling machine	15	86
Forbes & Myers, Worcester, Mass.		
Motor-driven bench grinder	45	91
Foster-Johnson Reamer Co., Elkhart, Ind.		
Automotive cylinder hone	59	93
Foster Machine Co., Elkhart, Ind.		
Geared-head screw machines	73	95
Wrenchless chuck	232	115
Fox Machine Co., Jackson, Mich.		
Multiple-spindle drilling machine	16	87
Three-way tapping machine	122	102
Franklin Machine & Tool Co., Springfield, Mass.		
Piston grinding and turning machine	75	95
Fraser, Warren F., Co., Westboro, Mass.		
Automatic cylindrical grinding machines	26	88
Fulflo Specialties Co., Blanchester, Ohio		
Motor-driven centrifugal pump	253	118
Gallmeyer & Livingston Co., Grand Rapids, Mich.		
Twist drill grinding machine	44	91
Gardner Machine Co., Beloit, Wis.		
Face grinding machine	28	88
Garrett, Samuel H., Philadelphia, Pa.		
Scrap bundling machine	136	103
General Aluminum & Brass Co., Detroit, Mich.		
Machine bearings	241	116
General Manufacturing Co., Detroit, Mich.		
Power press	103	99
Geometric Tool Co., New Haven, Conn.		
High-speed tapping device	129	102
Giddings & Lewis Mach. Tool Co., Fond du Lac, Wis.		
Internal grinding machine	35	89
Gloor, George A., Detroit, Mich.		
Drill jig	23	88
Golden Compass Co., Elkhart, Ind.		
Drawing instrument	209	113
Blackboard drawing instrument	211	113
Gorham Tool Co., Detroit, Mich.		
Milling cutters	220	114
Grant Mfg. & Machine Co., Bridgeport, Conn.		
Riveting machine	147	105
Gray, G. A., Co., Cincinnati, Ohio		
Planer	94	98
Hampden Supply Co., Springfield, Mass.		
Floor marking machine	264	119
Hanlon & Wilson, Wilkinsburg, Pa.		
Helical expansion reamer	219	114
Hanna Engineering Works, Chicago, Ill.		
Riveting machine	148	105
Harris Engineering Co., Bridgeport, Conn.		
Semi-automatic hob grinding machine	42	90
No. 415 automatic hob grinding machine	43	90
No. 815 automatic hob grinding machine	47	91
Hawes, C. L., Ashtabula, Ohio		
Gang drilling machine	17	87
Grinding attachment for planer	52	92
Heald Machine Co., Worcester, Mass.		
Hydraulic internal grinding machine	30	89
Additions to internal grinding machine	31	89
Double-head internal grinding machine	32	89
Belt tightener and countershaft	49	91
Hendey Machine Co., Torrington, Conn.		
Motor drive for cone-head lathe	80	96
Herbert, Edward G., Ltd., Manchester, England		
Hardness tester	179	109
Hergi Manufacturing Co., Bridgeport, Conn.		
Power-driven screwdrivers	152	105
Hydraulic Press Mfg. Co., Mount Gilead, Ohio		
Hydraulic pump	120	101
Independent Pneumatic Tool Co., Chicago, Ill.		
Screwdriver attachment for electric drill	214	113
Jones & Lamson Machine Co., Springfield, Vt.		
Optical comparator	173	108
Kenosha Die & Stamping Works, Kenosha, Wis.		
Bushings and liners	243	117
Kimmerle Bros., San Francisco, Calif.		
Arbor press	100	99
Kingsbury Manufacturing Co., Keene, N. H.		
Sensitive drilling machine	7	85
Knight, W. B., Machinery Co., St. Louis, Mo.		
Milling attachments	90	97
Koch, Paul W., & Co., Chicago, Ill.		
Fly cutter	218	114
Landis Machine Co., Waynesboro, Pa.		
Pipe and nipple threading machine	128	102
Landis, S. K., Co., Lancaster, Pa.		
Lathe and cylinder grinding machine	77	95
Langelier Mfg. Co., Arlington-Cranston, R. I.		
Drilling and tapping machines	14	86
Lapointe, J. N., Co., New London, Conn.		
Hydraulic broaching machine	134	103
Lapointe Machine Tool Co., Hudson, Mass.		
Broaching machine	135	103
LeBlond, R. K., Machine Tool Co., Cincinnati, Ohio		
25 and 27-in. lathes	61	93
13 and 15-in. lathes	64	93
Toolroom lathe	68	94
Semi-automatic lathe	74	95
Lees-Bradner Co., Cleveland, Ohio		
Gear tooth testing machine	174	108
Little Giant Co., Mankato, Minn.		
Combination lathe	76	95
Arbor press	101	99
Woodworking lathe	198	111
Band sawing machine	202	112
Lowe Manufacturing Co., Detroit, Mich.		
Sand sifting machine	263	119
Manley Manufacturing Co., York, Pa.		
Garage jack	196	111
Electric floor light	250	117
Manufacturers' Equipment Co., Chicago, Ill.		
Air cylinder	233	115
Marquette Tool & Manufacturing Co., Chicago, Ill.		
Die cushions	118	101
Master Electric Co., Dayton, Ohio		
Electric motors	248	117
Medart Co., St. Louis, Mo.		
Cupola tapper and stopper	262	119
Meylan, A. R. and J. E., New York, N. Y.		
Time-study watches	183	109
Microgage Co., Boston, Mass.		
Indicating gage	172	108
Milburn, Alexander, Co., Baltimore, Md.		
Acetylene welding generator	260	119
Modern Machine Tool Co., Jackson, Mich.		
Combination machine table and vise	19	87
Monarch Belting Co., Cleveland, Ohio		
Pulley covering	244	117

	No.	Page
M & S Manufacturing Co., Hartford, Conn.		
Grinding wheel dresser	213	113
Mueller Machine Tool Co., Cincinnati, Ohio		
Geared-head engine lathe	69	94
Oil grooving attachment for lathe	82	96
Myers Machine Tool Corp., Columbia, Pa.		
Engine lathe	66	94
National Acme Co., Cleveland, Ohio		
Self-opening die-heads	130	103
National Machine Co., Tiffin, Ohio		
Bolt and rivet heading machine	109	100
Newman, Montrose, Inc., New York, N. Y.		
Adjustable-jaw vise	230	115
Niagara Machine & Tool Works, Buffalo, N. Y.		
Hot forging press	108	100
Nicholls, William H., Co., Brooklyn, N. Y.		
Car wheel molding machine	145	105
Niles-Bement-Pond Co., New York, N. Y.		
Car wheel boring machine	3	85
14-foot engine lathe	65	93
Locomotive frame slotter	97	98
Noble & Westbrook Mfg. Co., Hartford, Conn.		
Drop-forged pliers	212	113
Ohio Electric & Controller Co., Cleveland, Ohio		
Motor-generator set	251	117
Ohio Machine Tool Co., Kenton, Ohio		
Crank shaper	95	98
Oilgear Co., Milwaukee, Wis.		
Hydraulic broaching press	102	99
Oliver Machinery Co., Grand Rapids, Mich.		
Motor-head lathe	197	111
Motor-driven surfacers	199	111
7-inch saw bench	200	112
No. 192 band sawing machine	201	112
No. 16 band sawing machine	203	112
Cut-off saw	204	112
Pangborn Corp., Hagerstown, Md.		
Barrel sandblasting unit	149	105
Sandblast operator's apron and hood	265	119
Pearson-Scott Co., Indianapolis, Ind.		
Bar-stock feeder	81	96
Plimpton Truck Co., Stamford, Conn.		
Elevating truck attachment	190	110
Porter-Cable Machine Co., Syracuse, N. Y.		
Belt sander and grinder	39	90
Center-drive lathe	79	95
Pratt & Whitney Co., New York, N. Y.		
Precision level	184	110
Precision & Thread Grinder Mfg. Co., Phila., Pa.		
Thread grinding attachment	51	91
Procunier, William L., Chicago, Ill.		
Tapping machine	123	102
Production Machinery Co., Jackson, Mich.		
Vertical lathe	1	85
Reed, Francis, Co., Worcester, Mass.		
Opposed-spindle drilling machine	13	86
Reed-Prentice Co., Worcester, Mass.		
Planer-type grinding machine	36	90
Engraver's cutter grinding machine	48	91
Reeve, G. A., Middletown, Ohio		
Belt shifter	237	116
Reliable Machine Works, Brooklyn, N. Y.		
Cutting-off toolholder	221	114
Robinson, J. M., Mfg. Co., Cincinnat, Ohio		
Toggle drawing press	106	99
Press brake	107	100
Rockford Milling Machine Co., Rockford, Ill.		
Double-end lathe	78	95
Rockwell, W. S., Co., New York, N. Y.		
Rotary quenching tank	146	105
Sachsenmaier, George, Co., Philadelphia, Pa.		
Air compressors	256	118
Schaap Co., Brooklyn, N. Y.		
Piston measuring tape	161	107
Sellew Machine Tool Co., Pawtucket, R. I.		
Multiple-spindle drilling head	18	87
Shakeproof Screw & Nut Co., Chicago, Ill.		
Lock washers	242	116
Shore Instrument & Mfg. Co., Jamaica, N. Y.		
Dial recording scleroscope	177	109
Pneumatic pedal	178	109
S.K.F. Industries, Inc., New York, N. Y.		
Spherical roller bearing	240	116
Slocomb, J. T., Co., Providence, R. I.		
Inside micrometer	160	106
Smith, R. G., Tool & Mfg. Co., Newark, N. J.		
Crankpin truing device	216	113
Specialty Mfg. & Sales Co., Brooklyn, N. Y.		
Safety locknut	239	116
S & S Machine Works, Chicago, Ill.		
Dial feeding device	115	101
Standard Electric Tool Co., Cincinnati, Ohio		
Post drill stand	20	87
Steptoe, John, Co., Cincinnati, Ohio		
Motor drive for lathe	83	96
Die slotter	96	98
Storm Manufacturing Co., Minneapolis, Minn.		
Cylinder refinishing machines	53	92
Superior Machine Tool Co., Kokomo, Ind.		
Upright drilling machine	6	85
Taylor-Shantz Co., Rochester, N. Y.		
Safety press guard	116	101
Thomson Spot Welder Co., Lynn, Mass.		
Spot welding machine	157	106
Toledo Machine & Tool Co., Toledo, Ohio		
Deep-drawing and stamping press	105	99
Triplex Machine Tool Corp., New York, N. Y.		
Combination machine tool	137	103
Tube Shear Co., Chicago, Ill.		
Tube shearing machine	154	106
Tucker & Dorsey Mfg. Co., Indianapolis, Ind.		
Shop truck	189	110
Turner Brass Works, Sycamore, Ill.		
Gasoline blow torch	261	119
Underwood, H. B., & Co., Philadelphia, Pa.		
Portable boring bar	4	85
United States Machine Tool Co., Cincinnati, Ohio		
Hand milling machine	84	96
Van Keuren Co., Boston, Mass.		
0.0001-inch gage set	162	107
Van Norman Machine Tool Co., Springfield, Mass.		
Piston grinding and turning machine	75	95
High-speed milling attachment	89	97
Wagner, Frederick A., Co., Inc., Rochester, N. Y.		
Center drill, reamer and countersink	225	114
Wallace Supplies Manufacturing Co., Chicago, Ill.		
Bending machine	132	103
Waltham Machine Works, Waltham, Mass.		
Thread milling machine	126	102
Warner & Swasey Co., Cleveland, Ohio		
Friction countershaft	236	116
Weaver Manufacturing Co., Springfield, Ill.		
Arbor press	98	98
Garage jack	195	111
Wells Corp., Greenfield, Mass.		
Dies and die-holders	131	103
Taper-pin reamer	223	114
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.		
Micarta for small gears	246	117
Automatic "auto-starter"	252	118
Whipp Machine Tool Co., Sidney, Ohio		
Open-side crank planer	92	97
Whiting Corp., Harvey, Ill.		
Crane brake	191	110
Whitney Metal Tool Co., Rockford, Ill.		
Angle-iron shear	153	106
Williams, White & Co., Moline, Ill.		
Surface grinding machine	38	90
Wisconsin Electric Co., Racine, Wis.		
Sensitive drilling machine	8	86
Type-A drilling machine	10	86
Flexible shaft outfit	141	104
Woods Engineering Co., Alliance, Ohio		
Internal grinding head	50	91
Wood Turret Machine Co., Brazil, Ind.		
Turret lathe	71	94
Yale & Towne Mfg. Co., Stamford, Conn.		
Roller-bearing trolley	192	110
Zernickow, O., New York, N. Y.		
Hand tachograph	182	109

Ideas from Practical Men

Devoted to the exchange of information on useful methods. Its scope includes all divisions of the machine building industry, from drafting room to shipping platform. The articles are made up from letters submitted from all over the world. Descriptions of methods or devices that have proved their value are carefully considered, and those published are paid for

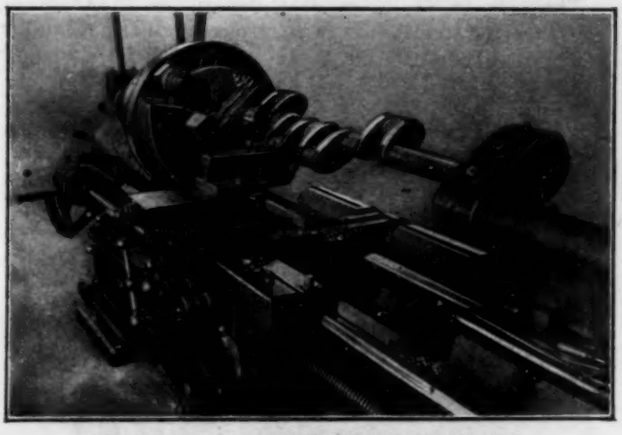
Turning Crankshafts in an Engine Lathe

By William Denton

An engine lathe arranged for turning the crankpins of a six-throw shaft for a marine motor is shown in the cut herewith. The fixture is kept permanently attached to the faceplate and the latter needs but to be swung into place and screwed on the spindle nose in order to make the lathe ready for the job.

The fixture is essentially a V-block, the centerline of which is parallel to and at the correct distance from the centerline of the lathe. Swinging clamps held down by bolts similarly fastened to the fixture complete the rig, so that there are no loose parts to get lost or to become out of adjustment. As the fixture is always used for the same size and style of shaft there is no necessity for adjustability, and the faceplate is counterbalanced for that particular job.

At the tailstock end is the block containing three



FIXTURE FOR TURNING CRANKSHAFT

hardened bushings located in one plane; the center bushing fitting the turned journal of the shaft at that end and the outer bushings a running fit on the tailspindle itself. Means are provided for clamping the shaft tightly in the center bushing. The outer bushings are at the correct throw distance from the center.

A line drawn on the turned journal of the shaft in a previous operation indicates the setting at the tailstock end by matching with a witness mark on the end of the center bushing. The shaft is then placed in the lathe with the throws in vertical plane, so as to avoid distortion or wringing of the shaft by the weight of itself and attached block, and the clamping bolts tightened. The V-block at the faceplate end will thus take care of the alignment automatically as the pressure comes on the clamps.

To turn the opposite throws the tailspindle is withdrawn from the bushing, a block of wood placed across the shears of the lathe to support the weight of the shaft, the clamping bolts loosened and the shaft rotated one-half turn in the V-block. The tailspindle will then enter the opposite bushing in the block and tightening the clamping screws at the faceplate end completes the alignment.

Regrinding, Reboring or Reaming Cylinders—Discussion

By W. J. Gardner

On page 774, Vol. 58, of the *American Machinist*, in an article under the above title, M. I. Sidler contends that reaming is the only good method for refinishing motor cylinder-bores.

My experience with a reboring machine is that it takes as skilled a mechanic to operate it as a grinding machine. The main objection to boring is the tendency of the boring bar to follow the hole in the block whether it is square or not.

With the reboring method, considerable amount of pressure will be exerted on the walls of the cylinders. Since these walls are comparitively thin and are only reinforced by water jackets in certain places, it will be found that where they are not reinforced, they will spring away from the cutting tool and then spring back after the tool passes on, leaving the cylinders smaller. Where the walls are reinforced the tool will take a slightly heavier cut. There are hard and soft spots in iron and the cutting will bite into a soft spot and spring away from a hard one.

In a rebored cylinder, the full bearing surface is not realized until from 0.002 to 0.005 in. of metal has been worn away by the piston and rings, allowing 0.003 in. clearance for the piston and from 0.004 to 0.010 in. for wear in both sides of the cylinder walls, which would allow 0.007 to 0.13 in. clearance between the cylinder and piston. This would cause piston slap and oil pumping in a short time.

When a cylinder is rebored, it is centered from one end where very little wear takes place and has to be made considerably oversize, whereas in grinding it can be centered in the middle of the length of the bore. Just enough can be taken out to true up to some standard oversize and the other cylinders in the block can be ground to that size.

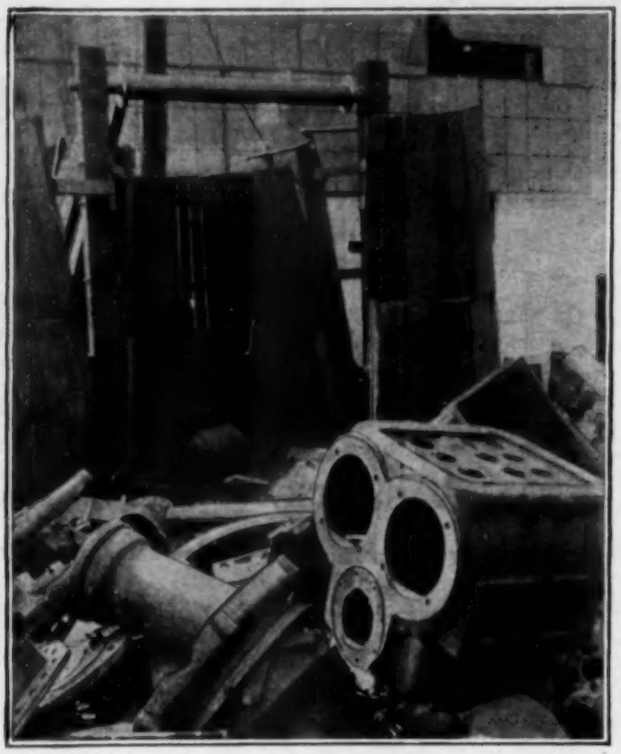
Mr. Sidler also states that ground cylinders wear faster owing to the particles of abrasive which have become embedded in the cylinder walls. Laboratory tests show that where ground cylinders are properly cleaned there is no abrasive whatever to be found. As all high-grade car manufacturers finish their cylinder bores by grinding, either they are all wrong, or else grinding is not guilty of the disadvantages claimed by those who like to use reboring machines and reamers.

I have known of cases where the cylinder grinding machine saved the repair shop the price of a cylinder block after it had been rebored or reamed.

Skull-Cracker Protection

By Chester H. Franklin

Using the old skull cracker still seems to be the only practical way of breaking up miscellaneous scrap castings before remelting, and when in use, the danger from flying pieces always has to be guarded against. While a few large plants have built guards of heavily reinforced concrete, they are the exception, but some



PROTECTING MEN WHEN USING THE SKULL CRACKER

kind of a wooden guard is usually erected. The illustration shows one of the latter in use in the scrap yard of the Commercial Iron Works, Los Angeles, Calif. It consists of heavy vertical timbers to support the circular plank structure surrounding the base on which are the castings to be broken up. The planks at the bottom are of double thickness, both on the stationary portion at the back and on the two swinging doors at the front. The illustration shows the skull-cracker weight, and some of the castings in the foreground.

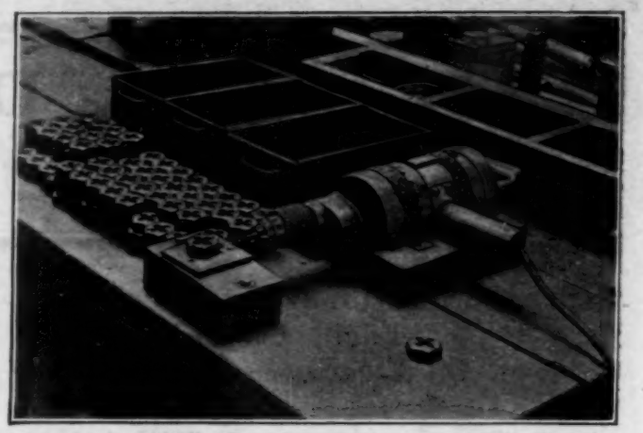
Improvised Power Screwdriver

By Milton Wright

For setting in the adjusting screws of small dies, an electric portable drill was rigged as shown in the illustration. Two beveled wooden blocks were nailed to the bench and a couple of straps of sheet metal were passed over the body of the drill and fastened by wood screws to the blocks. A screwdriver in the chuck and a block of steel of the right height, on which to lay the work, complete the outfit.

A foot-operated switch was contemplated for starting and stopping the drill but it was found in practice that the operator experienced no difficulty in entering the screwdriver in the slot with the drill running.

Having the electric drill already in the tool crib,



AN IMPROVISED SCREW SETTER

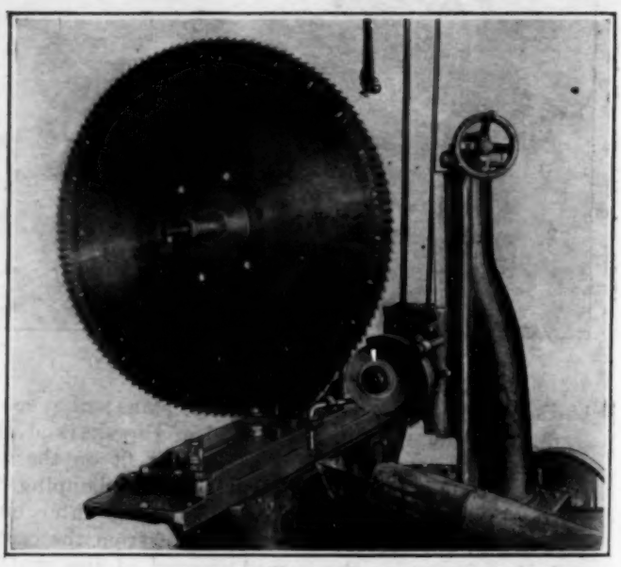
the cost of the device amounted to nothing more than the time spent in rigging it up, and this was returned many times over, even on a small lot of the dies, by the time saved over setting the screws by hand.

Sharpening a Large Saw

By William Denton

A saw sharpening job that is remarkable because of the size of the saw in comparison to that of the machine upon which the sharpening was done, is shown in the accompanying illustration.

The saw is 32 in. in diameter by $\frac{1}{8}$ in. thick and has inserted teeth. It was ground on the periphery and one corner of each tooth was beveled to an angle



SHARPENING A LARGE SAW

of 45 degrees. Two 4 in. raising blocks were used under the dividing head in which the saw was held.

The saw ran out quite badly sidewise and it was necessary to guide it true by means of a steel plug set in the face of an angle plate and brought to bear against the side of the saw at a point near the grinding wheel.

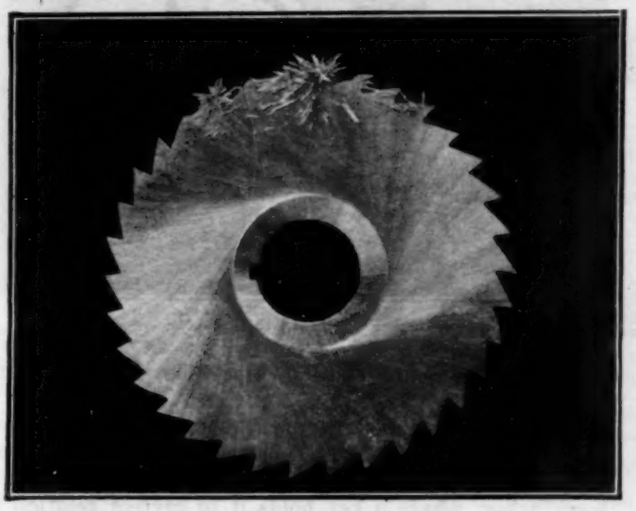
The wheel used was a 3,860 I, Norton Alundum. The work was done in the Brown & Sharpe Cutter Grinding Department and the time of grinding was 5 hr. and 18 minutes.

Magnetism in Cutters and Tools

By P. P. Phillips

A lot of trouble is caused in the milling department by residual magnetism in cutters, especially thin saws, and workmen are apt to blame the makers of these tools for leaving them too hard when the only reason for breakage is that they have not been properly demagnetized.

The accompanying illustration shows a new cutter



A MAGNETIZED CUTTER

that has never been in service, but was received from the manufacturer in the condition indicated by the clinging chips. It is easy to deduce what would happen to such a cutter if it were put to work without further demagnetizing it.

In these days of magnetic chucks and fixtures, especial care should be exercised by everybody who has to use them that all pieces of hardened steel that have, at any stage of manufacture, been in contact with such chucks or fixtures are thoroughly demagnetized before they leave the factory or department.

A Lapping Paste for Motor Bearings—Discussion

By R. R. Joseph

That kerosene and Sapolio combination, referred to in an article under the above title by I. B. Rich, and published on page 266, Vol. 55, of the *American Machinist*, is one of the best kinks I have found in a long time. I was scraping a taper bearing about 2 in. at the large end, 1¼ in. at the small and 8 in. long, and had been at it about two hours when the lapping compound referred to in the above-mentioned article came to mind. As it looked like another two hours' job I decided to try this compound on the bearing.

I put the spindle in a speed lathe and held the bearing by hand. Using kerosene and Sapolio mixed to a thin paste, I had a perfect bearing in ten minutes. The bearing was of bronze and the spindle of hardened steel.

I had another case where this compound did the trick. While fitting two mitre gears on an engraving machine, I found that the gears did not run well together, the indication being that the gear blanks were not running perfectly true when the teeth were cut. The gears made a grinding noise and showed signs of wear in some places.

A piece of Sapolio as big as a walnut and a quarter pint of kerosene made the gears run very smoothly, with that purr which is so pleasing to a mechanic's ears. The gears were made of Sanderson tool steel, and the whole job took but 15 minutes.

Taking the Machine to the Work

By Anis L. Welch

The die pocket in the base of our 1,500-lb. steam hammer was in bad condition and needed to be replaned. As the base weighed 15 tons and as the machine shop was some distance away, we decided to rig up to do the planing in place.

After removing the cylinder, ram and uprights, we took the head and knee from an old Gould & Eberhardt

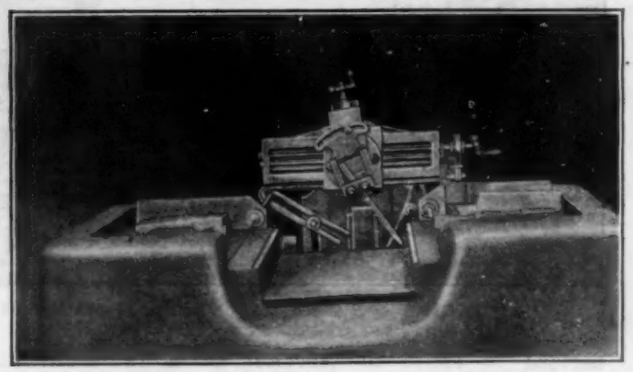


FIG. 1—FRONT VIEW OF SHAPER PLANING HAMMER BASE

shaper and brought the shaper to the hammer base, to which we fastened it by bolts and clamps as shown in the accompanying illustration.

A crossrail from a small planer was mounted on the shaper ram in place of the regular head. With the

FIG. 2—SHOWING HOW SHAPER WAS ATTACHED TO HAMMER BASE

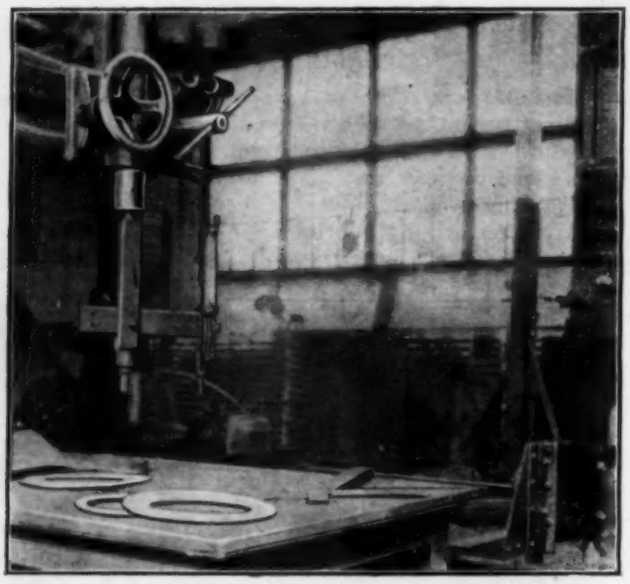
shaper properly aligned with the base, we were ready for business.

In spite of the long tool necessary to reach some parts of the work, the job was satisfactorily done and at a cost very much less than if the base had been moved to the machine shop and mounted on a planer.

Flame Cutting on a Radial Drilling Machine

By Herbert F. Crawford

The Galigher Machinery Co., Salt Lake City, Utah, is an extensive user of oxyacetylene for cutting and welding. Some time ago it became necessary to cut a number of rings from boiler plate steel, and it was



FLAME CUTTING ON A RADIAL DRILLING MACHINE

decided to enlist the services of a radial drilling machine for this purpose. A suitable table was constructed, mostly of steel angles, as shown in the accompanying illustration.

The sheets to be cut were laid on this table. The bar *A* carrying the crossarm *B* was placed in the spindle of the machine and the cutting torch clamped at the outer end of the crossarm. The center *C* was brought into position over the punch mark in the plate and the torch set at the proper radius to give the desired circles.

When properly adjusted, the spindle of the radial drill was revolved by hand at the desired speed, and the circles were quickly obtained. This method has the advantage of giving almost any radius desired, and of changing rapidly from one size to another.

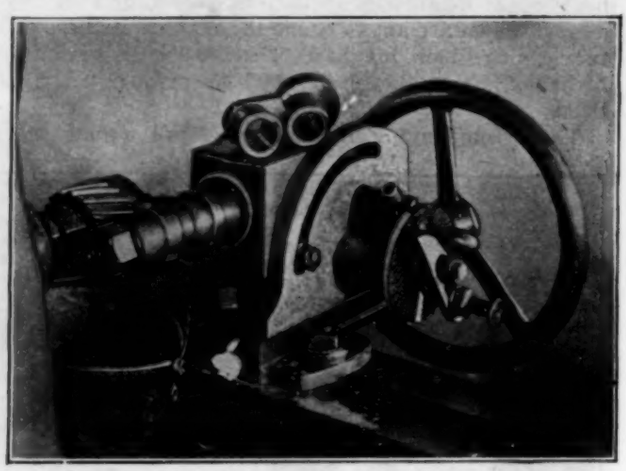
Rough Milling the Contours of Small Cams

By Milton Wright

A cheap and efficient way of rough milling the contours of small cams such as are used on stationary and marine gas engines is shown in the accompanying illustration. The requisites are: a hand milling machine, an old dividing head that one is not bound to treat with more than ordinary respect, and a chain fall. A master-cam, a cutter and a hardened steel collar are also needed.

The head is mounted crosswise on the table of the machine. A suitable work arbor is provided to take the master cam and one of the blanks to be milled, also a weight. On the cutter arbor is an ordinary standard spiral fluted cutter and, next to it, a hardened steel collar of the same outside diameter as the cutter.

The table of the machine is weighted to move to the right (left in the picture) and cause the master cam on the work arbor to bear hard against the steel collar on the cutter arbor. To change work pieces, the weight



RIG FOR MILLING CAMS

is lifted by the chain fall and the table moved by hand away from the cutter.

A finished cam and a cam blank as it comes from the screw machine are shown in the picture, lying on top of the dividing head. The blank is placed on the work arbor, where a key holds it in correct relation to the master-cam, and the weight is lowered to move the work against the revolving cutter. The latter cuts its way into the blank until the master-cam stops against the hardened collar on the cutter arbor, when there can be no further movement in that direction and consequently no further cutting.

The work arbor is then given one complete turn by means of the hand wheel and the master-cam causes the table to move to and from the cutter as the contour travels over the hardened collar. The cutter thus makes of the blank a duplicate of the master cam.

A Kink in Thread Cutting

By John D. Law

When using the compound slide of the lathe set at 30 deg. for cutting U.S.F. threads, the tool is ground with a slight backward slope, which certainly speeds up the operation. The depth to which to feed in the cut is more or less guess work, and one is tempted to leave rather more than is necessary to finish up with a properly ground thread tool; which results in the loss of the time previously gained. Knowing the length of side, the amount to be left for finishing can be determined exactly.

With a V-thread the side equals the pitch. With the U.S.F. thread, however, we have the flats to contend with in finding the length of side. Since the width of the flat is $\frac{P}{8}$ and is the same top and bottom of thread, the side of the flat equals the width, and, therefore, taking twice the length of flat from the pitch will give the length of side required. More simply expressed, this is $0.75P$.

I always use the above method when cutting threads of coarse pitch and find it far better and more reliable than guessing.

News Section

Railroads Storing Coal For Winter Use

Substantial progress is being made by the railroads in carrying out provisions of the program unanimously agreed upon by them in New York last April, in accordance with which they are to complete by Sept. 1 the storage of coal designed for railroad use, so that after that date the equipment and other transportation facilities may be used to the greatest extent for the transportation of commercial coal necessities.

Forty-four railroads representing 75 per cent of the total mileage of the Class One railroads of this country reported that during the month of June they stored 1,821,412 tons of coal. This would mean that each of the 44 roads during the month of June stored an average of more than 41,000 tons.

Including the 1,821,412 tons which was stored during June, the 44 railroads on July 1 had a total of 6,638,812 tons of coal in storage, compared on June 1 with 4,817,400 tons.

This would indicate that the railroads are co-operating with the Secretary of Commerce in his efforts to get the industries of this country to lay in their winter coal during the light consuming season—that is, from now until Sept. 1 of this year.

Record Established in Freight Movement

The heaviest freight traffic for May and within striking distance of the highest figure ever reached is reported by the Bureau of Railway Economics after study of reports just received from Class 1 carriers. Net ton miles, or the figure reached by multiplication of tons of freight by the distance carried, for May, last, amounted to 39,597,582,000, an increase of 2.7 per cent over the previous high May record reached in 1917 and an increase of 41.7 per cent compared with May of 1922 when the coal strike was on.

"Substantial progress is being made by the railroads in carrying out the program adopted by the carriers in April calling for a speeding up in the movement and the heavier loading of freight cars," according to the report. "The daily average movement per freight car in May was 28.6 miles. Except in May, 1917, when an average of 29 miles was attained, this average has never been excelled in any month before and only once equalled, that one time being in the Fall of 1920. The average of 28.6 miles was an increase of three-fifths of a mile over the average for April, and was an increase of 5.9 miles over that for May last year.

"In computing this average movement per day account is taken of all freight cars, including those loaded, those in the process of being loaded and unloaded, and also those on side tracks either awaiting repairs or for which no load is immediately available.

"Every increase of one mile in the average movement of a freight car is equivalent to the addition of 100,000 freight cars to the country's transportation facilities without any increase in capital expenditure, so that the increase in the average over April was equivalent to the addition of 60,000 freight cars.

"The average load per car in May was 28 tons. This was the highest for any May since 1917, when the compilation of these statistics began, except for May, 1920, when the average was 28.2. The average for May this year was an increase of two-fifths of a ton over that for April.

"The program adopted by the railroads calls for a daily average movement per car of thirty miles and for the loading of all freight cars to maximum capacity in an effort to bring the average loading to thirty tons per car for the entire country."

Big Contracts Received at Cramp Yards

New contracts for hydro-electrical machinery aggregating 180,000 horsepower were announced by the William Cramp & Sons Ship & Engine Building Co. This additional equipment is to be placed in service, the announcement says, throughout the United States and Canada.

The largest single contract calls for the construction by the Dominion Engineering Works, Ltd., Canadian licensees of Cramp's, of two 58,000 horsepower turbines for the Queenston, Niagara, development of the Hydro-electric Power Commission of Ontario. The same plant also received a contract from the commission for two Johnson penstock valves and two sets of I. P. Morris governors.

Other contracts reported include two 10,000 horsepower turbines for the Northern Canadian Power Co., one 14,000 horsepower impulse wheel for the Southern Sierras Co., two 7,500 horsepower turbines for the Montana Power Co. and an additional turbine for the Washington Water Power Co., all from the Pelton Water Wheel Co. of San Francisco; and a 7,500 horsepower turbine for the Amoskeag Manufacturing Co., to be built in the I. P. Morris shops in Philadelphia.

Anthracite Shipments in June Are Large

Shipments of anthracite for June totaled 6,634,787 gross tons. This compared with 6,564,285 tons for May. Shipments in June show an increase over the corresponding month of 1921 of 602,850 tons, or 10 per cent. No comparisons are made with June last year on account of the coal strike at that time.

The average monthly shipments for the first quarter of the current coal year amounted to 6,457,615 tons, an increase over the average of the first quarters of 1921-1922 of 8.9 per cent.

Europe Optimistic Says Westinghouse Man

Brudenell P. Boyle, assistant to the European manager of the Westinghouse Electric International Co., who is on a short business trip to this country from London, predicted a general but slow improvement in European business conditions.

Mr. Boyle has been in the export business for many years and is very familiar with general world affairs. He was rather reluctant to make any definite statements on the European situation, which is so unsettled that it is rash to attempt any predictions, but said that the general tone in England seemed to be toward stability.

People there are becoming tired of the unsettled conditions and are making up their minds to take things as they are and make the most of them. Except for some of the poorer classes who are living on the unemployment doles of the government and are content to remain idle, the average Englishman is anxious to get back to work and start production. Many of the war-made fortunes have also been spent by this time.

Speaking of the French-German situation, Mr. Boyle said that there could be no real stability in Europe until the Ruhr matter was settled, and that he could see no prospect of a speedy settlement. He did not see how the French could withdraw from Germany now, nor did he think that they would do so unless there were a violent upheaval in France itself caused by the industrial unrest.

Since France is mainly an agricultural country, however, the majority of the population is fairly comfortable and is behind the government. The most likely cause of a change in the situation, Mr. Boyle thinks, will come from Germany, where he expects a change of government and a more frank attempt to pay off the indemnity.

General Electric Shows Big Gains

Annual sales of the General Electric Co. increased from about $12,000,000 to $243,000,000 in the thirty years between Jan. 1, 1893, and Jan. 1, 1923, a statement issued by the corporation discloses.

The outstanding capital stock increased from $35,000,000 to $184,000,000 and the value of its manufacturing plants from $4,000,000 to $167,000,000. The number of employees grew from 4,000 to more than 74,000.

The statement was issued as a review of the corporation's accomplishments under the leadership of Charles A. Coffin, who is retiring as chairman of the board after thirty years of continuous service. Tribute is paid also to the accomplishments of E. W. Rice, Jr., former president of the corporation, and to its corps of engineers, including Professor Elihu Thomson and Dr. Charles P. Steinmetz.

Philadelphia Chamber of Commerce Proposes to Establish Industrial School

THE absence of uniform standards of apprenticeship, and the present haphazard system of teaching the skilled trades to young men, is the cause of failure to provide artisans for future needs in industry, it is reported by a committee of leading industrialists of Philadelphia, representing the Industrial Relations Committee of the Chamber of Commerce.

The present apprenticeship methods or lack of methods, would be replaced under the committee's recommendations, with a uniform program, in the operation of which the whole plan of teaching the trades would be broadened into a comprehensive scheme calling for a co-operative undertaking between the industries and the state and city school systems.

The sub-committee of the Industrial Relations Committee has just completed its report covering recommendations for a new apprenticeship program. Months of study were spent in making up the report, compiled after conferences with the city and state school officials. The study is the most extensive ever attempted in Philadelphia, and members of the committee believe none so broad has been attempted anywhere. The task of making the recommendations effective will be a part of the Chamber of Commerce's program. William F. James of the Westinghouse Co. is chairman of the sub-committee.

Two, three and four-year courses for machinists, with alternate activity by the apprentice in shops and trade schools, is one of the main features of the committee's program.

The two-year industrial course calls for practical shop work, except evenings and one day each two weeks, when the apprentice would attend school, either one of the public institutions or one of the recognized trade schools.

The Curriculum

The first year is for study of trade drawing, including instruction in the use of instruments, geometrical problems, principles of orthographic projection, standard threads, bolts and nuts, blue print reading, including principles of view and section arrangement, conventionalization, dimensioning, coordinated study of prints related to trade practice and other subjects useful in machine shop work.

The second year calls for a study of trade drawing, machine details and elementary assembly, trade mathematics, ratio and proportion, involution and evolution, elementary formulas, and the practical use of tables of trigonometric functions. These would be supplemented with talks and studies and vocational practice. The completion of the two-year course would entitle the apprentice to an Improver's Certificate to Industry.

The three and four-year courses cover virtually the same ground, except in more detail. Completion of the latter courses gives the apprentice a Machinist's Diploma to Industry.

The plan would be made effective through the Trades Education Association of Philadelphia which it is proposed to organize through the Chamber of Commerce. This would be made up of industries, a governing body would be formed and the details for the apprentice system to operate would be worked out by it. A wage system during apprenticeship is provided.

The association would take an industrial census to determine accurately the normal supply and demand of the various crafts and the apprentice and trades education requirements of each.

The series of conferences held by the committee, at which scores of industries sent their executives to testify, demonstrated that there "is a serious shortage of skilled mechanics, and that the present extent of apprentice training is entirely inadequate to the needs of the future."

Manufacturing Revival in Milwaukee

Foundry and machine shop operations in the Milwaukee district appear once more to be holding their own following the loss of some ground during May and June. This was due more to excessive labor turnover because of keen competition for skilled labor among local industries as well as outside shops, and the lack of any supply of replacement labor, than to any material dropping off in business.

Since July 1, interest among machinery users seems to be increasing. New orders placed in June were smaller than in other months in the recent past. Many salesmen for dealers said prospective buyers continued to seek quotations and delivery dates, but hesitated about closing, probably awaiting developments when effect was being felt from a wave of warnings that more caution be exercised to prevent undue inflation such as occurred three years ago.

One of the most pleasant developments of the past few weeks is the pronouncement from a number of the largest producers of passenger automobiles that their research gives substantial reason for projecting current output schedules indefinitely, which will mean a further continuance of active buying of metal and woodworking machinery. The volume may not be as large as in the past eight to twelve months, when the principal aim was to bring up the elements of production, while for at least some time to come it is believed that the main buying will be to keep equipment rounded out against replacement needs and secure greater efficiency.

For several weeks the call for woodworking machinery has been more active than purchases of metal working machinery by automobile shops. It is said the major problem is to build enough enclosed bodies to satisfy the demand. The heaviest buyer of woodworking machinery at the present is the Ford interests, which are investing between $4,000,000 and $6,000,000 in further development of a great sawmill, planing mill and body factory at Iron Mountain, Mich. This project also is taking a large quantity of hydroelectric and steam generating equipment and includes also a large machine shop unit.

Industrial construction has experienced a lull, doubtless owing to the fact that most concerns are satisfied to rest at the present limit of their facilities and not overreach themselves. Fabricators of structural shapes in this territory are well filled up with work, and several of the largest shops have not been able to accept additional business, excepting small tonnages for repair work, since the middle of May. The small jobs are taken, as a rule, only when an old customer places an order and the accomodation is a matter of policy.

Manufacturers of toolroom and floor equipment are running steadily on old and current orders, at a rate comparable to the average of the past six months.

New York Business Moves at Even Pace

Even during the warm weather when everyone expects a lull, business in the Metropolitan district in the machine tool line is better than was anticipated, in fact so good with some dealers that vacations have been deferred. This statement is not meant to convey the impression that there is a sudden boom in business, but merely to show that there are fewer complaints than are usual at this time of the year and sales charts show a less perceptible downward curve than was expected.

Politics and politicians, while noisy and distracting, do not seem to have the bad influence that was expected and business men generally have come to the conclusion that presidential campaigns are bugaboos that have been given too much serious thought in the past. Railroad buying is not up to standard and some attribute this to Mr. Harding's trip while others claim ability to prove that it is merely seasonal and wholly temporary. However, there is some railroad buying and this, combined with a little in each of the other classifications, makes a total business of fair proportions.

Business is not so brisk in the used tool line as it has been during the Spring and early Summer and dealers are at a loss to explain the let down. Purchasing proves simple, but the resales are slower than usual, it is claimed.

There is every reason to believe that there will be a general revival of buying in the Fall and that things will move at a more even pace from then on. While automotive production has somewhat abated those with inside knowledge state that this means that the Fall will see a busier season than ever in that industry.

Textile mills are looking forward to a busy autumn season, which means machine-tool business.

Machine Tool Offices in New Building

Many prominent firms have taken space in the new Pershing Square Building in East 42nd St., New York City, and from every indication other machine tool companies will have headquarters in the building. Within the past few years there has been a steady movement of the industries' offices uptown and with the completion of the new building in the heart of the city the movement has been intensified. Among the engineering and machine tool houses that have moved into the building are: Manning, Maxwell & Moore; the Cyclops Steel Co.; the Bridgeport Brass Co.; the United Alloy Steel Co.; the American Electrical Works; and the Bartlett-Haywood Co.

Pittsburgh Business at Steady Pace

While there are no great events in the machinery market there is a fair amount of buying, coming steadily and not by flashes of activity followed by dull periods. Last week was featured by the buying of 75 tools for the Westinghouse Electric & Manufacturing Co.'s transformer plant at Sharon, Pa. Among the dealers who received orders in the past ten days are Manning, Maxwell & Moore, Inc., a small punch and shear; McCoy-Brandt Machine Co., two milling machines; Somers, Fitler & Todd, Brown & Zortman Machinery Co., the Consolidated Machine Tool Corp., and others, in such items as planers, grinding machines, radial drills, milling machines, etc. The local board of education has closed bids on a list of 22 machinery items for the finishing up of a new high school in this city, and buying on these is beginning to develop.

While no large sales are reported, there are so many small sales that they make a good total in the aggregate in lathes, drilling machines and grinding machines. Inquiries are coming in every day, among them one on a grinding machine about to be closed that involves the expenditure of $8,000 to $9,000. Among the buyers of machinery lately was the Union R.R. for a 52-in. carwheel borer and a large lathe for one of the steel corporation units.

As to used machinery a fair amount of selling is reported. Some used machinery has been sold and sent out of town, a punch press and a No. 6 Becker milling machine going to Indiana. A local dealer last week disposed of a pipe machine, punch and shear and radial drill. The Carbon Steel Co. sold a 20-ton Shaw crane to the Reliance Coke & Furnace Co., and has more ready for shipment to other customers. Installation of cranes proceeds quite well, and several awards are about to be made. It is thought that the June business was not much below that of the previous month, and that July ought to exceed that of June, owing to the mills being good buyers of tools used in repair work.

Unfilled Steel Orders Decline in June

A reduction of 595,090 tons in the amount of forward business carried on its books as of the close of business June 30, 1923, was reported by the United States Steel Corp. The reduction was much larger than had generally been expected in the financial district because of the favorable statements made early in June to the effect that increased buying on the part of the railroads would offset curtailed demand in other products. The increased rail orders, however, were not sufficient to offset the slack in other products.

The reduction reported makes the total orders carried on the books 6,386,261 tons. This is the smallest total reported since the close of August last year, when forward business aggregated 5,950,105 tons. It represents a drop of more than a million tons from the peak total of 7,288,509 tons for 1923, reported at the close of March, and compares with 6,981,351 tons at the close of May this year and with 5,635,531 tons at the close of June last year.

At the rate of production reported for June it is estimated that the mills of the corporation shipped on an average of 46,000 to 48,000 tons of finished steel daily, or a total of between 1,200,000 and 1,250,000 tons for the entire month. Taking this figure and the amount of the reduction in forward orders given above, it is calculated that new business was on an average of between 25,000 and 27,000 tons daily, or between 600,000 and 650,000 tons for the month. In May shipments aggregated 1,350,000 tons, and new bookings more than one million tons. It is believed that the corporation has sufficient business on its books to keep its plants operating at 90 per cent of capacity for the balance of the year. A renewal of buying on the part of consumers is expected soon, according to opinions expressed in steel trade circles.

Business in the South Reaches Record

Production in the Alabama district, and in all of the metal trade industries throughout the South, continues at a high level with no signs of abatement. The peak, however, has been reached, and there is not likely to be an upward turn in production for the rest of the year. Holding around the present level for the rest of 1923, the metal trade industries of the district will experience their largest production year in history, according to the Metal Trades Association headquarters.

There has been a further improvement in export shipments out of Southeastern ports during the past month, and this business is now believed to have reached the highest level in the history of the industry. Large quantities of Southern made machinery, supplies and general iron and steel products are being shipped to Latin-American countries, with Cuba probably the best buyer at this time.

St. Louis Shops Still Well Occupied

Perhaps it is the warm weather that is holding back the receipt of new orders, but in any event there has been little improvement in the machine tool situation in St. Louis during the past two weeks. Shops are running on practically full schedule because of orders not yet filled but inquiries have been very limited.

Railroads are buying little and are very conservative in what they do buy; the oil fields of the Southwest are likewise very quiet and are virtually out of the market. One firm has had a representative in that section of the country for more than a month and he reports no activities. There are no new projects under way that are further advanced than the conversation stage, and no expansions or improvements worthy of note in this section.

The automotive industry has been active, though this field is limited in the Southwest.

Some machine tool men look for things to open up toward the Fall. Few look for a slump this Winter because of the proximity of the presidential election, though they think this may have an adverse effect on the railroads' buying through their fear of contrary legislation.

Chicago Business Better Than Last Year

Although business is rather slow in the machine tool industry in Chicago, it continues to be better than last year. Last week the Denver & Rio Grand R.R. spent approximately $200,000 in purchasing machine tools in the Chicago district. The Chicago, Burlington & Quincy Ry. has not purchased machine tools for which it made inquiry several weeks ago and reports are to the effect that it is not expected to close for a month or so. The Santa Fe R.R. has issued another list. Industrials are doing very little buying. Used machine tools continue in demand.

A few Chicago dealers who sold rather heavily to the railroads were able to report June business as being better than any month this year and sales made last week will make it possible for them to report good business during July. The indications for the general situation here point to a dull month which is partly attributed to the seasonal slump. Manufacturers and merchants in the Chicago district report that business is fair. But they are generally conducting their enterprises on a hand to mouth basis. They are not producing or stocking up for future trade. A falling off in business and a continued decline in commodity prices are clearly evident.

Producers of iron in the Chicago district are in a fairly good position for the next thirty days or more, but new buying of importance will have to develop in order that the present rate of furnace output may be maintained.

June proved to be a much better month in the pig iron market than May.

Record Automotive Pace Slowing Down

Automobile production in the United States this month is expected to show a decided falling off from the output of June, according to statements made in the trade. The c rtailment will in part be due to seasonal falling off in demand for open models and in part to the closing down of factories for the semi-annual inventory.

While the demand for cars is not so active as it has been, it is said to be sufficient to warrant many plants operating on fairly active schedules. Dealers in some sections of the country have sufficient open models on hand to satisfy the demand during the Summer or at least sufficient to meet the call during July.

Westinghouse and Western Both Prosperous

The Westinghouse Electric & Manufacturing Co. and the Western Electric Co. both report favorable bookings during the first half of the current year.

Figures of the Western Electric Co. show that this organization's billed goods were valued at $114,890,000 in the first half of 1923, an increase of $15,237,000, compared with the same period last year. Orders booked in the first half of this year approximated $142,805,000, which is $57,363,000 more than in the same period last year.

The Westinghouse Electric & Manufacturing Co. reports new orders valued at $47,500,000 in the second quarter of 1923, against $32,119,000 in the same period last year.

News of Washington Activities

By Paul Wooton

THE anthracite report, made public recently, is destined, many believe, to exert a powerful influence on the entire coal industry. Its 21 recommendations indicate that the industry's ills have been diagnosed skillfully. There will be differences of opinion as to the benefits which would follow the application of these recommendations, but it must be admitted that the report places main responsibility on the persons in the industry to conduct it so that imperative public interests will be reasonably served.

It stands out all through the report that the Commission conceives the anthracite business as being affected by the public interest and impressed with the public use—phrases used several times in the report. One of the most significant statements in the whole report is this one: "Coal is quite as much a public necessity as gas, street railway service or any other service or commodity that has been brought under public regulation. The Commission admits that there is not sufficient basis in knowledge or experience as to just how far control or regulation should be exercised in insuring maximum service to the public by the coal industry, but the industry itself is asked to modernize its wage agreements and the machinery for interpreting them; to set up an adequate inspection service of its own; to take hold of the problem of resizing; and to improve its practices generally, but it also calls upon the public to take a healthy interest in looking out for its own welfare. The Commission does recognize that any failure on the part of the industry to discharge properly its own responsibilities, thereby stopping the flow of coal long enough to imperil the public interest, would justify the government in taking over "the operation of the mines and the transportation and distribution and marketing of the product with full power to determine the wages to be paid the mine workers, the prices at which the coal shall be sold and, subject to court review, the compensation to be paid to land and mine owners." Not more than a month ago, the Supreme Court of the United States, in the Kansas Industrial Court case, said that since the adoption of our Constitution the vocations of the coal miner and the coal operator have not been regarded as public callings. The utterance of the Court is an historical fact, but this jury of six representative Americans has decreed something different for the future. That jury holds "that a limited natural monopoly like anthracite, held by a relatively small number of individuals, estates and companies, and supplying a necessity of life for millions of our people can not continue to be treated as if it were not affected by a public interest."

Of the 21 recommendations, 15 constitute disinterested counsel to men in the coal business. Two of them deal with regulation, two with emergency powers, one with the uniform ton and one is a recommendation to the Interstate Commerce Commission.

Coal at Lake Erie Ports Nears Record

From Jan. 1 this year to July 2, a total of 10,217,830 tons of bituminous coal had been dumped at Lake Erie ports for shipment up the lakes, according to reports just received by the Car Service Division of the American Railway Association.

This is the largest amount of coal that has ever been transported to Lake Erie points and dumped during the corresponding period in the last six years, except for that period in 1921 when the total to July 2 exceeded the total this year by 38,059 tons.

Reports also showed that during the week which ended on July 2 this year, 21,245 cars containing 1,120,990 tons of bituminous coal were dumped at Lake Erie ports. This was the largest number of cars dumped at Lake Erie ports during any corresponding week in the last six years, except in 1921 when that total was exceeded by 141 cars. Reports show that 17,576 cars of coal, or approximately 900,000 tons, were on hand at Lake Erie ports on July 2 awaiting to be dumped.

Code of Ethics for Gas Products Makers

The Eighth Annual Convention of the Gas Products Association, held at Excelsior Springs, Mo., recently adopted a code of ethics. Since the code, which contains the best points of codes previously adopted by various trade organizations, covers the relation of employer and employe, relations with those from whom purchases are made, relations between members of the industry, their customers, the public and the government, members of the Association plan to have copies printed and sent to their customers and employees.

Comparative Prices of Shop Supplies

Average of New York, Chicago and Cleveland Prices

	Unit	Current Price	Four Weeks Ago	One Year Ago
Soft steel bars..	per lb....	$0.034	$0.034	$0.0252
Cold finished shafting.....	per lb....	0.042	0.042	0.0335
Brass rods.....	per lb....	0.1825	0.1850	0.1566
Solder (½ and ½)	per lb....	0.2862	0.2862	0.21
Cotton waste...	per lb....	0.1231	0.1231	0.101
Washers, cast iron (⅛ in.)...	per 100 lb.	4.66	4.66	3.83
Emery, disks, cloth, No. 1, 6 in. dia.....	per 100...	3.08	3.08	3.11
Lard cutting oil	per gal...	0.575	0.608	0.575
Machine oil....	per gal...	0.349	0.349	0.36
Belting, leather, medium.....	off list....	37%	42½%	46½%
Machine bolts up to 1x30 in.	off list....	44½%	44½%	56½%

Foundrymen Prepare for European Tour

Members of the Foundrymen's Association are making preparations for the tour through Europe which will take place during August and September of this year. According to the tentative program that has been issued, members will leave New York on the Leviathan on Aug. 18 and arrive in Southampton on the twenty-fourth. Entertainment has been arranged in England where various plants will be visited and inspected, notably those at Sheffield, Manchester, Birmingham and London.

Crossing the channel accompanied by members of the Institution of British Foundrymen, the party will arrive at Calais and proceed to Paris arriving there on Sept. 11. At Paris they will attend the International Foundrymen's Congress where papers prepared by prominent American, British and French authorities will be discussed.

On Sept. 18 the party will leave Paris for Nancy and from that point they will visit battlefields around the St. Mihiel and the Verdun sectors. At Liege the party will inspect the Cockerill Works, the Conduit d'Eau plant and the Fabrique Nationale. After Liege, Brussels and Lille will be visited and on Sept. 26 the American contingent will sail on the Homeric from Cherbourg arriving in New York on Oct. 2. It is not at the present time known the number of members that will make the trip. The arrangement for the tour are in charge of Thomas Cook & Sons, Philadelphia office and are under the direction of Stanley G. Flagg, Jr., vice-chairman of the committee on international relations of the A.F.A.

Slight Seasonal Decrease in Labor Demand

There was a slight decrease in employment in the country last month, according to a survey by the Labor Department. Thirty-one cities reported increased employment while in thirty-three cities there was a slight falling off in industrial activities.

Among the cities reporting enlarged activities are Toledo, Philadelphia, Chattanooga, Boston, Chicago, Bayonne, Johnstown, Louisville and Jersey City. Decreases are reported in Seattle, Denver, Cleveland, Perth Amboy, Buffalo, Trenton, Paterson, Detroit, Passaic, Niagara Falls, Bridgeport, New York, Newark and Baltimore.

The shading down in employment appeared in the paper and printing manufactures, in the textiles and their products. This is regarded as merely seasonal and may disappear in due time. The demand for farm labor continues, and in some sections the shortage of this class of help is acute. Progress in State and Federal road building is being hampered, the survey says, because of insufficient labor. Shortage of carpenters, bricklayers and plasterers exists in many cities according to the report of the survey.

The Business Barometer

This Week's Outlook in Commerce, Finance, Agriculture and Industry Based on Current Developments

By THEODORE H. PRICE
Editor, *Commerce and Finance*, New York

(Copyrighted, Theodore H. Price Publishing Corporation, 16 Exchange Place, New York)

THE markets kept step with the news from Europe last week. Until the British Premier had spoken on Thursday they were quiet and thereafter they improved. He gave the impression of being conciliatory, but firm, and those who are schooled in the ways of European diplomacy insist that he has made it practicable for France to abandon her untenable position with dignity.

If the greatest war in history was not so recent it would be thinkable, as some assert, that the questions at issue would lead Europe to take up arms again. But even the fiery Frenchmen are not likely to fight until the struggle whose hostilities were ended in November 1918 has become a fainter memory than it is today.

The alarming tone of some of the European cables may therefore be discounted. The correspondents who send them must be sensational to get the attention of the jaded public for whom they write, but American business men will wisely proceed upon the theory that there will not be another war for at least ten years.

Even if this theory should be a mistaken one action upon it will not be costly to the United States in an economic sense. If Europe goes to fighting again whatever wealth it has left will be thrown into America's lap and as a nation we will be like the Fuggers, the Medici and the Rothschilds of the past who prospered so mightily in financing the internecine quarrels in which the monarchs of their time were perpetually engaged.

This allusion is not, however, intended to belittle the horror of the next war about which so many are glibly talking. Its very horror is one of the reasons why it will not occur and another reason is that out of self interest America's power must sooner or later be organized to put Europe on its feet. In the wheat market we are getting a taste of what the continuance of chaos overseas will mean to us. Wheat is below a dollar in Chicago, principally because there is little or no export demand for our surplus production.

The Agricultural Department estimates that our prospective crops, not including tobacco, are worth over seven billion dollars at present prices. The wheat crop is put at 821,000,000 bushels and the yield of corn at 2,877,000,000 bushels.

But such crops, usually considered as the surest basis of prosperity, will mean loss and poverty to the farmers unless a consumptive demand for them at fair prices can be developed. This is why the really forward looking man will be optimistic as he faces the present situation.

Through the credits she has extended and can extend, this country has the power to control the economic policy of Europe and it is as certain as anything political can be that our Government will soon be compelled to use this power in the interest of our agricultural classes. Meantime we may be sure that the banks will help the farmer to hold his grain and that he will find salvation in the very magnitude of the disaster that seems to threaten.

In nearly every other aspect the outlook is highly satisfactory. Railroad car loadings continue to break previous records and railroad earnings are correspondingly good. For May they were at the equivalent of 6.33 per cent per annum on the officially estimated value of the roads, and for June they will be equally large, if not larger. The steel industry is a little less busy, but busy enough, and the domestic demand for copper is on a scale which partially offsets the reduced exports. Cotton is firmer as the weather grows hotter down South. The mills who are buying very sparingly in the hope of lower prices will do well to remember that procrastination is frequently the thief of profits as well as of time.

"Railroad car loadings continue to break previous records and railroad earnings are correspondingly good. For May they were at the equivalent of 6.33 per cent per annum on the officially estimated value of the roads, and for June they will be equally large, if not larger. The steel industry is a little less busy, but busy enough, and the domestic demand for copper is on a scale which partially offsets the reduced exports."

Sugar is in *status quo*. For the balance of this season the big Cuban sugar companies will be able to name the price at which the remnant of this year's crop will be sold and they are not likely to let it go much lower. Coffee for delivery in May 1924 has sold as low as 6.75, at which price it seems cheap. The Brazilian government is not buying, but as its unsold holdings are comfortably financed they are not likely to come on the market inopportunely.

The wool market is quiet. The best judges say that higher prices are unlikely, but they do not expect any decline at present. Building materials are easier and coal is obtainable at prices which seem relatively moderate and at which large users will probably do well to secure their winter's supply. The market for hides and leather is still unexplicably poor. There are some who attribute it to the disuse of harness and the growing use of "leatherized" cotton cloth in upholstery.

The output of automobiles is at last slackened, but the manufacturers say that the dullness is seasonal. At 25 cents rubber seems reasonable for those who can merchandise its products. Dry goods jobbers complain that trade is dull, but as the department stores and the mail order houses all report increased sales it is to be inferred that stocks are small.

The stock market has stopped declining. The bond market is better and the indications are that some recent prophets of disaster will soon have to double on their tracks again. The railroad stocks should certainly be worth more soon unless earnings are no longer an index of value. The increased production of petroleum is still urged as a reason for selling the oil stocks, but the logic of the argument is not appealing. The use of oil for fuel is meantime increasing amazingly.

The Governor General of Canada has signed the bill giving him discretionary authority to embargo the export of pulp wood from Canada. The embargo is not therefore mandatory as had been supposed, and in Washington the bill is construed as to notice that Canada is preparing for retaliation against our tariff if retaliation be necessary. To this end she is putting herself in a position to raise the cost of newsprint to the American newspapers who constitute the most vocal as well as the most sensitive element of the community. That it is a shrewdly planned move is not to be denied.

The weekly statement of the Federal Reserve System shows a gain of $13,000,000 in gold and a rise of 1 per cent in the reserve ratio, which now stands at 75.4 per cent. These figures assure a continued abundance of credit and a financial condition from which great prosperity can be easily evolved provided confidence in the future of Europe is soon re-established.

The imports for June are valued at $328,000,000 as against exports worth $329,000,000. The result is a favorable balance of $1,000,000. This compared with an excess of $74,000.000 in exports in June, 1922, and an adverse balance of $56,000,000 in May 1923.

May Shipments of Iron and Steel Large

Exports of iron and steel products from the United States during May exceeded foreign shipments for any one month since June, 1922, according to figures of the Iron and Steel Division of the Department of Commerce. Most noticeable advances over the April, 1923, are gains in steel rails and accessories, plain wire, boiler tubes, and welded pipe, and cast iron pipe and fittings.

Good Order Locomotives Increase in Number

The railroads of the United States on July 1 had the largest number of locomotives ready for service and the smallest number in need of repair for any time since compilation of such reports by the car service division of the American Railway Association on Aug. 1, 1920. Serviceable locomotives on July 1 totaled 52,456, an increase of 1,237 over the number on June 15, according to the report.

Motive power in need of repair on July 1, the report said, totaled 11,450, or 18 per cent of all the engines on line. On June 15 the total was 12,659, or 19.9 per cent.

On July 1 only 16.2 per cent was in need of heavy repair, or a total of 10,326, this being 1,147 engines below the June 15 total.

On July 1 the railroads had 2,181 serviceable locomotives stored in readiness for increased traffic demands.

Business Items

The Athol Manufacturing Co., which was incorporated recently with a capital stock of $600,000 to manufacture machinery, succeeds the company of the same name which was incorporated in 1915 by L. S. Starrett to manufacture artificial leather and rubberized fabrics and which had a capitalization of $2,000,000. Mr. Starrett was president of the company at the time of his death some months ago, since which time it has undergone a reorganization with the new corporation as a result. Officials of the L. S. Starrett Co. are among those interested in the new company including Willard G. Nims, Frank A. Ball and Arthur H. Starrett.

The largest coal mining hoist in the world will be installed at Orient No. 2 mine of the Chicago, Wilkington & Franklin Coal Co., at West Frankfort, Ill., and the contract has been awarded to the Westinghouse Electric & Manufacturing Co. and the Nordberg Manufacturing Co. The Westinghouse company will furnish the complete electrical equipment for the hoist, which will be twice as large as any in North America at the present time. The largest similar machine now known is equipped with a motor having a capacity of 1,400 hp. The capacity of the hoist motors of the Orient No. 2 hoist will be 4,400 hp., divided into two motors, one mounted at each end of the drum shaft.

The Colonial Supply Co., Pittsburgh, has been appointed exclusive distributor in the Western Pennsylvania territory for the Latrobe Tool Co., Latrobe, Pa., manufacturers of high-speed drilling machines and reamers.

The new factory of N. A. Strand & Co., Chicago, was opened with a reception on July 14. The factory is located at Lincoln and Argyle Sts.

The entire personal property and real estate of the bankrupt Aspinwall-Drew Co., Waterloo, Wis., was offered for sale at public auction jointly by Michael Tauber & Co. and Samuel L. Winternitz & Co., Chicago, on July 12. The inventory value is in excess of $100,000. The Waterloo concern manufactured barn equipment. The inventory included shears, hack-saws, punch presses, pipe bending machines, drilling machines, engine lathes, milling machines, tap-tumbling barrels, post boring machines, riveting and punch presses, and ten motors and generators.

The Oshkosh Motor Truck Co., Oshkosh, Wis., manufacturer of motor trucks with quadruple drive, is resuming production on more nearly a capacity scale through the completion of additional financing. An issue of $100,000 of first mortgage bonds has been made.

The local committee appointed by the Milwaukee Association of Commerce for the American Mining Congress, to be held Sept. 24-29 in the Municipal Auditorium, consists of the following: Max W. Babb, vice-president, the Allis-Chalmers Mfg. Co., chairman; Bruno V. Nordberg, sales manager, the Nordberg Mfg. Co.; E. K. Swigert, vice-president, the Bucyrus Co.; N. C. Lamont, general manager, the Worthington Pump & Machinery Corp.; W. J. Fairbairn, secretary-manager, the Milwaukee Metal Trades and Founders Bureau; Frank Cleveland, convention secretary, the Association of Commerce. This will be the twenty-sixth annual convention and will be accompanied by the customary exposition of mining machinery and equipment.

Loss estimated at about $10,000 was caused by a fire which recently destroyed the foundry and shops of the Orangeburg Foundry Co., at Orangeburg, S. C.

The machine shops and warehouse of the Connors Steel Co., of Birmingham, Ala., comprising what is known as Plant No. 1, were destroyed by fire recently at a loss estimated at about $200,000.

The Southern Iron & Equipment Co., of Atlanta, general manufacturers of iron and steel products, announces the opening of new offices at Pittsburgh, Pa., and at Seattle, Wash., for handling the company's trade in these territories.

The American Nickel Corp. has discontinued its Pittsburgh sales office and has moved the sales organization to the main office and plant at Clearfield, Pa.

The Bridgeport Worm & Gear Manufacturing Co., Bridgeport, Conn., has purchased part of the plant of the American & British Manufacturing Co., corner of Crescent Ave. and Helen Court, and have moved to that location. The company was formerly located at Stratford, Conn.

A motion picture showing the employer-employee relationship idea as it is worked out in the Riverside & Dan River Cotton Mills, Danville, Virginia, has been made and is being distributed in the various industrial plants by the Rothacker Film Manufacturing Co., Chicago.

Fire damaged the offices and stockrooms of the New York Central R.R. shops at Depew, N. Y., recently, destroying about $50,000 worth of electrical and other equipment. The executive offices of the shop were also ruined.

The Chicago office of the Latrobe Tool Co., Latrobe, Pa., has been moved to 1,440 West Lake Street.

Obituary

ROBERT WOOLSON HUNT, founder of the Robert W. Hunt Co., Chicago, died at the age of 84 years at his home on July 11. Mr. Hunt was prominent in engineering circles and a complete obituary will be printed in the *American Machinist* next week.

WALTER MONTIETH AIKMAN, long identified with the stamping, enameling and galvanizing industries, died recently in his ninety-sixth year at his home in Greenwich, Conn. Mr. Aikman at the time of his death was chairman of the board of directors of the Central Stamping Co., Newark, N. J.

L. J. MAESCHER, president of the Pioneer Boiler & Machine Works of Los Angeles, Cal., died in that city on July 1, aged 57 years.

HENRY C. ROBERTS, for 36 years connected with the Avery Co., makers of agricultural implements, at Peoria, Ill., and formerly vice-president of the company, died in Los Angeles, Cal. June 22, aged 66 years.

GILES A. GRAVES, for the past eight years foreman and superintendent of the tool room at the plant of the L. C. Smith & Brothers Typewriter Co., Syracuse, N. Y., died recently at his home in that city, aged 50 years.

Personals

J. G. FOGERTY, JR. will have charge of the new offices of the Lawrence M. Stein Co., Chicago, that will be opened in Atlanta, Ga. The company makes power sewing machines and factory equipment and the new territory will include all of the Southeastern states.

M. H. BLANK has been appointed works manager of the Engine Motors, Inc., Indianapolis, Ind. Mr. Blank was formerly connected with the Cole Motor Car Co., the Cadillac Motor Car Co., Continental Motors, Inc., and the General Electric Co.

H. T. MARTIN, assistant to the president of the Lanston Monotype Machine Co., Philadelphia, has resigned and will open an office in New York City, at 32 Union Square. He will conduct a consulting engineering service, covering production, designing, organizing in the metal and printing arts.

C. L. DICKERT has been appointed superintendent of motive power for the Central of Georgia Railway with headquarters in Savannah, Ga. Mr. Dickert succeeds W. H. Fetner who has resigned.

E. L. COX has been appointed assistant master mechanic at Macon, Ga., for the Central of Georgia Railway, succeeding W. A. McCafferty.

W. A. MCCAFFERTY has been appointed master mechanic at Columbus, Ga., for the Central of Georgia Railway, succeeding A. J. Flowers.

A. J. FLOWERS has been appointed master mechanic at Macon, Ga., for the Central of Georgia Railway, succeeding C. L. Dickert.

A. B. BREEZE, vice-president and general manager of the Cincinnati Ball Crank Co. has resigned. Prior to his connection with this concern he was the district sales manager and assistant general superintendent of the National Acme Manufacturing Co., Cleveland, Ohio.

GEORGE GORDON CRAWFORD, president of the Tennessee Coal, Iron & Railroad Co., of Birmingham, Ala., has gone to Europe to make an extensive tour for the purpose of studying new industrial advancements which have been made since the war.

FRANK NEWMAN SPELLER, metallurgical engineer of the National Tube Co. at Pittsburgh, has been given an honorary degree of doctor of science by the University of Toronto. He has been identified with research work on the corrosion of steel for a long time.

CALVIN L. JONES, welding engineer of the Westinghouse Electric & Manufacturing Co., stationed at Atlanta, Ga., has been elected vice-president of the American Welding Society, and will be in charge of the society's interests in the South.

JOSEPH L. SCHOLL, formerly with the Pittsburgh office of Niles-Bement-Pond Co., in the sale of machine tools, but more recently identified with the McCoy-Brandt Machinery Co., has become affiliated with the Reliance Machinery Sales Co., Pittsburgh.

R. B. HUBBELL has been placed in charge of machine tool sales with the Greenfield Tap & Die Corp., Greenfield, Mass. Mr. Hubbell formerly was connected with the Norton Co. and the Heald Machine Co. and is well known to the trade.

FRANK J. WESCHLER, who for years has borne an important part in the affairs of the Hendee Manufacturing Co., Springfield, Mass., producers of the Indian motorcycle, was elected president of the organization at a meeting of the directors July 10. He succeeds to the place made vacant by the death of Henry H. Skinner, early in the year. He will continue to act as general manager, a post he has held for the past year, during which time the plant system has been reorganized.

L. W. SCHEN has been appointed in charge of the laboratory of the Price Electric Co., Cleveland. He was formerly with the Hickok Electric Instrument Co., Cleveland.

W. A. THOMPSON, comptroller of the Allis-Chalmers Mfg. Co., Milwaukee, Wis., has been appointed secretary to fill the vacancy caused by the recent death of Henry Woodland, secretary and treasurer. Raymond Dill, assistant treasurer, has been appointed treasurer. D. A. Stuart, auditor, is made assistant treasurer, and J. A. Keogh, assistant secretary.

E. J. WILKIE has been appointed Northern sales manager of the Bucyrus Co., South Milwaukee, Wis., the territory embracing Wisconsin, Minnesota, the Dakotas, upper Michigan and eastern Montana. He succeeds E. R. Weber, resigned. Mr. Wilkie has been connected with the sales department 14 years and continues to make his headquarters at the general offices in South Milwaukee.

WALTER ROGERS has joined the Vonnegut Machinery Co., Indianapolis, Ind., and will have charge of the accessory department for that company. He was formerly with the Taft-Pierce Manufacturing Co., Woonsocket, R. I.

C. F. ROGERS, formerly representing C. E. Johansson, Inc., has been appointed factory representative for the W B. Knight Machinery Co., St. Louis.

ERNEST W. DUSTON has been appointed chief engineer with the American Bolt Corp., New York City.

CLINTON R. FRENCH will succeed his father, H. S. French, deceased, as president of the Machinery Forging Co., Cincinnati, Ohio.

H. A. DEITERS has been appointed manager of the Price Electric Co., Cleveland. Mr. Deiters was formerly master mechanic with the Ferro Machine & Foundry Co., Cleveland.

WILLIAM R. HILL, formerly sales manager for the Yale & Towne Manufacturing Co., Stamford, Conn., has been elected president of the Sargent & Greenleaf Co., Inc., Rochester, N. Y.

THOMAS H. ENDICOTT has been appointed as vice-president and general manager of the Green Equipment Corp., Chicago. Mr. Endicott was formerly sales manager for the metal cutting department of the E. C. Atkins Co. and previous to this connection was sales engineer with the Crocker-Wheeler Co.

GEORGE D. MARTIN was elected secretary and treasurer of the William Cramp & Sons Ship & Engine Building Co., Philadelphia, at a recent meeting of the directors.

Trade Catalogs

Pumps. The Gould Manufacturing Co., Seneca Falls, N. Y. A four-page folder in the form of a letter has been issued by this company in which the double suction centrifugal pumps manufactured by it are illustrated and described. The folder is complete and exceptionally well arranged.

Stokers. The Combustion Engineering Corp., New York City. The Type K stoker manufactured by this company is illustrated and described in a broadside that has been issued recently. The application of the product to various types of boilers is also shown.

Drilling Machines. The Kingsbury Manufacturing Co., Keene, N. H. Two folders have been issued by this company, one showing the semi-automatic sensitive ball bearing two-spindle drilling machine and the other the multiple spindle gang type. Specifications are given in both cases and illustrations show the advantages of both machines.

Airplane Tools. Wright Aeronautical Corp., Paterson, N. J. Field service tools for airplane repairs are listed in a catalog issued by this company. A special service kit is featured.

Washing Machines. The Crescent Washing Machine Co., New Rochelle, N. Y. "Washing Metals by Machinery" is the title of a new booklet that has been issued by this company in which the advantages of using washing machines in factories are put forth. The principles of the machines and a list of the metal working factories using the machines are also given.

Leather Belting. The Chicago Belting Co., Chicago, Ill. A new lot of circulars has been issued by this company in which the uses of belting in factories are shown by illustrations and text and the many economies of good belting are put forth.

Twist Drills and Reamers. The Latrobe Tool Co., Latrobe, Pa. The 1923 catalog of high speed twist drills and reamers made by this company has been issued. The catalog contains 111 pages in which are shown prices, specifications and uses of the tools.

Ground-Form Cutters. The Brown & Sharpe Manufacturing Co., Providence, R. I. Sectional drawings, half-tone illustrations and excellent descriptive text regarding the product of this company are to be found in a pamphlet that has been issued. Ground-form gear cutters, spline shaft cutters, and sprocket cutters are discussed.

Milling Machines. The Ingersoll Milling Machine Co Rockford, Ill. Pictures showing the interior of the factory at Rockford are printed in a broadside that has been issued by this company. A descriptive article tells of the immensity of the factory and the methods of assembling the milling machines.

Grinding Wheels. Vitrified Wheel Co. Westfield, Mass. The efficiency of the grinding wheel that is made by this company is told in a folder that has recently been issued. Sizes and descriptions of various wheels are also given.

Pyrometers. The Brown Instrument Co. Philadelphia, Pa. "The Automatic Control of Temperature in the Heat Treating of Steel" is the title of a booklet that has been issued by the Brown Instrument Co. Factories where the instrument is in use, testimonials from users and interesting halftones of the machine itself are to be found in the booklet together with descriptive matter.

Chucks. The Skinner Chuck Co., New Britain, Conn. A condensed catalog showing the various chucks made by this company has been issued. Lathe, drill and planer chucks with dimensions and prices are shown in the unique booklet.

Riveters. Hanna Engineering Works, Chicago, Ill. A folder showing fifteen types of riveters has been recently issued. Short descriptions accompany silhouetted cuts, making the folder most attractive.

Grinders. The Wisconsin Electric Co., Racine, Wis. The Dumore high-speed grinder as it appears in use in factories and sectional views of the various parts have been combined in a broadside that has been issued. Speed and accuracy are featured in the folder.

Export Opportunities

The Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C., has inquiries for the agencies of machinery and machine tools. Any information desired regarding these opportunities can be secured from the above address by referring to the number following each item.

Canning machinery. Turin, Italy. Agency. Reference No. 7117.

Cement-making machinery, capacity 500 barrels daily. San Jose, Costa Rica. Purchase. Reference No. 7076.

Galvanized iron bending machinery. Chihuahua, Mexico. Purchase. Reference No. 7124.

Oil-well drilling machinery. Bilbao, Spain. Purchase. Reference No. 7074.

Presses, automatic, for production of small metal articles. Sofia, Bulgaria. Purchase. Reference No. 7086.

Forthcoming Meetings

New Haven Branch of the American Society of Mechanical Engineers. Third annual machine tool exhibit Sept. 18, 19, 20 and 21. Mason Laboratory, New Haven, Conn. A. C. Jewett, chairman.

Association of Iron and Steel Electrical Engineers. Iron and steel exposition, Buffalo, Sept. 24 to 28. John F. Kelly, secretary, Association of Iron & Steel Electrical Engineers, 708 Empire Building, Pittsburgh, Pa.

American Management Association. October 29, 30, and 31 Hotel Astor, New York City.

The Weekly Price Guide

RISE AND FALL OF THE MARKET

Iron and Steel—Pig-iron prices gradually declining, owing to unsettled market conditions and slowness of buying. A fair-sized volume of new steel plate inquiries, for tank and car construction, marks the beginning of the third quarter. No deviation from the $2.50 base on plates and shapes. Bars still $2.40 per 100 lb. f.o.b. mill. Fair volume of new demand for structurals. Production at mills dropping off slightly owing to labor shortage and weather conditions.

Advances—Copper prices climbing slowly; advance of ⅛c. per lb. quoted during week. Tin also showing steady price improvement owing to slow arrivals of foreign metal; market advanced 1⅛c. since last week. Zinc, $1 per ton higher; sheet mills taking fairly heavy tonnages.

Declines—Lead market quiet; dropped 35c. per 100 lb. in week. Copper wire down ⅛c. per lb. in New York. Linseed oil, raw, in 5-bbl. lots, $1.10 per gal., f.o.b. New York, against $1.13, last week.

IRON AND STEEL

PIG IRON — Per gross ton — Quotations compiled by The Matthew Addy Co.:

CINCINNATI	
No. 2 Southern	$29.05
Northern Basic	29.27
Southern Ohio No. 2	29.27
NEW YORK—Tidewater Delivery	
Southern No. 2 (silicon 2.25@2.75)	34.25
BIRMINGHAM	
No. 2 Foundry	25.00
PHILADELPHIA	
Eastern Pa., No. 2x (silicon 2.25@2.75)	28.76
Virginia No. 2	32.17
Basic	27.76
Grey Forge	27.26
CHICAGO	
No. 2 Foundry local	29.11
No. 2 Foundry, Southern (silicon 2.25@2.75)	30.51
PITTSBURGH, including freight charge from Valley	
No. 2 Foundry	27.77
Basic	26.77
Bessemer	28.77

IRON MACHINERY CASTINGS—Cost in cents per lb. of 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight 275 lb.:

Detroit	6.75
Cleveland	6.75@7.40
Cincinnati	6.75
New York	5.50@7.00
Chicago	4.00@5.00

SHEETS—Quotations are in cents per pound in various cities from warehouse; also the base quotations from mill:

Blue Annealed	Pittsburgh, Large Mill Lots	New York	Cleveland	Chicago
No. 10	3.00	4.59	3.75	4.15
No. 12	3.10	4.64	3.80	4.20
No. 14	3.20	4.69	3.85	4.25
No. 16	3.40	4.79	3.95	4.35
Black				
Nos. 17 and 21.	3.70	4.95	4.45	4.85
Nos. 22 and 24.	3.75	5.00	4.50	4.85
Nos. 25 and 26.	3.80	5.05	4.55	4.90
No. 28	3.85	5.15	4.65	5.00

Galvanized	Pittsburgh	New York	Cleveland	Chicago
Nos. 10 and 11.	4.00	5.15	4.70	5.10
Nos. 12 and 14.	4.10	5.25	4.80	5.20
Nos. 17 and 21.	4.40	5.55	5.10	....
Nos. 22 and 24.	4.55	5.70	5.25	5.65
No. 26	4.70	5.85	5.50	5.80
No. 28	5.00	6.15	5.80	6.10

WROUGHT PIPE (Welded)—The following mill discounts are to jobbers for carload lots on the latest Pittsburgh basing card:

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
		BUTT WELD			
1 to 3	62	50½	⅜ to 1¼	30	13
		LAP WELD			
2	55	43½	2	23	7
2½ to 6	59	47½	2½ to 4	26	11
7 and 8	56	43½	4½ to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			
		BUTT WELD, EXTRA STRONG, PLAIN ENDS			
1 to 1½	60	49½	⅜ to 1¼	30	14
2 and 3	61	50½			
		LAP WELD, EXTRA STRONG, PLAIN ENDS			
2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 and 8	52	39½	7 and 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

Warehouse discounts are as follows:

	New York Black	New York Galv.	Cleveland Black	Cleveland Galv.	Chicago Black	Chicago Galv.
1 to 3 in. steel butt welded	48%	34%	55½%	43½%	50%	37%
2½ to 6 in. steel lap welded	44%	30%	53½%	40½%	47%	34%

Malleable fittings: Classes B and C, banded, from New York stock sell at list plus 15%. Cast iron, standard sizes, 17½% off.

SEAMLESS STEEL TUBING—Following base discounts are on 20 gauge or .035-in., round, cold-drawn tubing, ¼-in. to 1-in., O.D., weighing 0.17 lb. to 0.36 lb. per ft. Cutting charge per 100 cuts, $1.50 to $1.58:

O.D. Inches	List Price per ft.	Differential Discount	O.D. Inches	List Price per ft.	Differential Discount
¼	$0.09	50%	⅞	$0.16	35%
⅜	.11	45%	1	.18	31%
½	.14	40%			

NOTE—The discounts are to be lowered by the following differentials in the case of regular .10-.20 carbon: 25,000 ft. or over, 83; 15,000 to 25,000 ft., 82; 5,000 to 15,000 ft., 81; 1,000 to 5,000 ft., 80; less than 1,000 ft., 79.

MISCELLANEOUS—Warehouse prices in cents per pound in 100-lb. lots:

	New York	Cleveland	Chicago
Open hearth spring steel (base)	5.00	6.00	4.50
Spring steel (light) (base)	7.00	6.00	6.00
Coppered Bessemer rods (base)	7.50	8.00	7.35
Hoop steel	5.19	4.66	4.55
Cold rolled strip steel	7.50	8.25	7.25
Floor plates	5.80	5.66	5.80
Cold finished shafting or screw	4.40	3.90	4.30
Cold finished flats, squares	4.90	4.40	4.80
Structural shapes (base)	3.64	3.46	3.40
Soft steel bars (base)	3.54	3.36	3.32½
Soft steel bar shapes (base)	3.54	3.36	3.32½
Soft steel bands (base)	4.39	3.61	3.95
Tank plates (base)	3.64	3.71	3.40
Bar iron (3.25 at mill)	3.54	3.36	3.32½
Carbon tool steel	11.00	....	....
Drill rod (from list)	55%	40@55%	50%

Electric welding wire, New York, 5/32, 8½c.; ⅛, 7.85c.; 3/32 to 1/16, 7.35c. per lb.

METALS

Current Prices in Cents Per Pound

Copper, electrolytic (up to carlots), New York			15.37½
Tin, 5-ton lots, New York			39.50
Lead (up to carlots), St. Louis	5.80	New York	6.37½
Zinc (up to carlots), St. Louis	6.25	New York	6.70

Shop Materials and Supplies

METALS—Continued

	New York	Cleveland	Chicago
Aluminum, 98 to 99% ingots, 1-15 ton lots	26.20	27.00	27.50
Antimony (Chinese), ton spot	8.00	10.00	8.25
Copper sheets, base	24.50	23.75@24.00	23.00
Copper wire (l.c.l.)	17.25	21.00	16.25
Copper bars (l.c.l.)	22.00	24.25	19.50
Copper tubing (l.c.l.)	27.00	29.25	23.00
Brass sheets (l.c.l.)	19.75	24.25	18.75
Brass tubing (l.c.l.)	25.50	29.75	20.50
Brass rods (l. c. l.)	18.00	21.00	15.75
Brass wire (l. c. l.)	20.25	22.00	.....
Zinc sheets (casks)	10.25	10.10	.....
Solder (½ and ½), (caselots)	28.50	29.50@31.50	20.00
Babbitt metal (83% tin)	56.00	49.00	40.00
Babbitt metal (35% tin)	30.00	17.00	16.00
Nickel (ingot and shot)	29.00	.....	35 00
Nickel (electrolytic)	32.00	.....	35.00

SPECIAL NICKEL AND ALLOYS—Price in cents per lb.

Malleable nickel sheet (base)	57.00
Hot rolled rods, Grade "A" (base)	55.00
Cold drawn rods, Grade "A" (base)	63.00
Copper nickel ingots	37.00
Hot rolled copper nickel rods (base)	45.00
Manganese nickel hot rolled rods "E"—low manganese (base)	57.00
Manganese nickel hot rolled rods "D"—high manganese (base)	60.00

Base price of monel metal in cents per lb., f.o.b. Huntington, W. Va.:

Shot	32.00	Hot rolled rods (base)	40.00
Blocks	32.00	Cold drawn rods (base)	48.00
Ingots	38.00	Hot rolled sheets (base)	42.00

OLD METALS—Dealers' purchasing prices in cents per pound:

	New York	Cleveland	Chicago
Copper, heavy, and crucible	13.50@14.00	12.00	12.00
Copper, heavy, and wire	13.25@13.75	11.50	11.00
Copper, light, and bottoms	11.25@11.75	9.50	10.00
Lead, heavy	5.00@ 5.50	5.00	5.75
Lead, tea	4.50@ 4.75	4.00	4.75
Brass, heavy, yellow	7.50@ 7.75	....	7.50
Brass, heavy, red	11.00@11.50	9.50	9.50
Brass, light	6.00@ 6.50	5.00	6.50
No. 1 yellow brass turnings	7.50@ 7.75	6.00	7.00
Zinc	3.75@ 4.25	3.00	3.50

TIN PLATES—American Charcoal—Bright—Per box.

		New York	Cleveland	Chicago
"AAA" Grade:				
IC,	20x28, 112 sheets	$23.50	$19.50	$18.50
"A" Grade:				
IC,	20x28, 112 sheets	21.00	17.00	17.00
	Coke Plates—Primes, 20x28 in.			
100-lb.,	112 sheets	14.00	12.60	14.50
	Terne Plates—Small lots, 8-lb. Coating			
IC,	14x20	8.25	6.55	7.40

MISCELLANEOUS

	New York	Cleveland	Chicago
Cotton waste, white, per lb.	$0.10@0.13	$0.15	$0.11
Cotton waste, colored, per lb.	.08@.13	.12	.08
Wiping cloths, 13½x13½, per lb.	10.75@11.00	36.00 per M	.10
Wiping cloths, 13½x20½, per lb.	....	52.00 per M	.13
Sal soda, per 100 lb.	1.65	2.25	2.65
Roll sulphur, per 100 lb	3.85	3.25	3.50
Linseed oil, per gal., 5 bbl. lots	1.10	1.22	1.28
White lead, dry or in oil	100 lb. kegs.	New York,	14.00
Red lead, dry	100 lb. kegs.	New York,	14.00
Red lead, in oil	100 lb. kegs.	New York,	15.50
Fire clay, per 100 lb. bag		.65	.60
Coke, prompt furnace, Connellsville	per net ton	$4.50@5.00	
Coke, prompt foundry, Connellsville	per net ton	5.50@6.00	

SHOP SUPPLIES

Current Discounts from Standard Lists

	New York	Cleveland	Chicago
Machine Bolts:			
All sizes up to 1x30 in.	30%	50-10%	45-5%
1½ and 1¼x3 in. up to 12 in.	15%	50%	50%
With cold punched hex. nuts up to 1 in. diam. (plus std. extra of 10%)	15%	$3.50 net	....
With hot pressed hex. nuts up to 1x30 in. (plus std. extra of 10%)	20%	3.50 net	$4.00 off
Button head bolts, with hex. nuts	List net	List net	.....
Hex. head and hex. nut bolts	List net	.....	65-5%
Lag screws, coach screws	30%	.....	60-5%
Square and hex. head cap screws	60%	70%	70-10%
Carriage bolts, up to 1 in. x 30 in.	25%	45%	40-5%
Bolt ends, with hot pressed nuts	30%	.....	55%
Tap bolts, hex. head, list plus	35%	.....	.....
Semi-finished nuts, ⅞ and smaller	60%	.....	...
Semi-finished nuts, ¾ and larger	55%	65-10%	80%
Case-hardened nuts	40%	.....	.....
Washers, cast iron, ½ in., per 100 lb. (net)	$6.50	$4.00	$3.50
Washers, cast iron, ¼ in., per 100 lb. (net)	5.50	4.00	3.50
Washers, round plate, per 100 lb. Off list	1.50	4.00	3.50 net
Nuts, hot pressed, sq., per 100 lb. Off list	List net	2.75	2.50
Nuts, hot pressed, hex., per 100 lb. Off list	List net	2.75	2.50
Nuts, cold punched, sq., per 100 lb. Off list	List net	2.75	2.50
Nuts, cold punched, hex., per 100 lb. Off list	List net	2.75	2.50
Rivets:			
Rivets, 7/16 in. dia. and smaller	40%	50-10%	60%
Rivets, tinned	40%	50-10%	4½c. net
Button heads ¾-in., ⅞-in., 1x2 in. to 5 in., per 100 lb (net)	$5.50	$3.90	$3.75
Cone heads, ditto (net)	5.60	4.00	3.85
1½ to 1¾-in. long, all diameters, *EXTRA* per 100 lb.	0.25	.....	0.15
¾ in. diameter *EXTRA*	0.15	.....	0.15
½ in. diameter *EXTRA*	0.50	.....	0.50
1 in. long, and shorter *EXTRA*	0.50	.....	0.50
Longer than 5 in. *EXTRA*	0.25	.....	0.25
Less than 200 lb. *EXTRA*	0.50	.....	0.50
Countersunk heads *EXTRA*	0.35	.....	$3.70 base

Lard cutting oil (50 gal. bbl.) per gal.	$0.55	$0.50	$0.67½
Machine lubricant, medium-bodied (50 gal. bbl.), per gal.	0.297	0.35	0.40
Belting—Present discounts from list in fair quantities (½ doz. rolls).			
Leather—List price, 2c. per sq.in., per ply:			
Medium grade	30-10%	30-10%	30-10%
Heavy grade	20-5-2½	30%	20-5-2½%
Rubber and duck:			
First grade	50-10-5%	50-10%	40-10%
Second grade	60-10%	60-5%	60-5%
Abrasive materials—In sheets 9x11 in.,			
No. 1 grade, per ream of 480 sheets:			
Flint paper	$6.30	$5.84	$6.48
Emery paper	9.90	11.00	8.80
Emery cloth	31.12	31.12	29.48
Flint cloth, regular weight, width 3½ in., No. 1 grade, per 50 yd. roll.	4.73	4.28	4.95
Emery discs, 6 in. dia., No. 1 grade, per 100:			
Paper	1 49	1.24	1 40
Cloth	3.38	2.67	3.20

New and Enlarged Shops

Machine Tools Wanted

D. C., Wash.—Peerless Motor Co., 1501 14th St.—cylinder grinders and lathes for metal work.

Ill., Chicago—Chicago Signal Co., 312-318 South Green St., W. P. Goodalt, Mgr. —1½ Universal milling machine and pulley base drill.

Kan., Anthony—Anthony Auto Salvage & Supply Co. (machine shop), J. M. Hall, Purch. Agt.—power drill press, lathe, emery wheel with stand, belting, hangers, pulleys and shafting.

Kan., Anthony—V. A. Fallier (welding) —welding outfit, power metal lathe, drill press, hangers and belting.

Kan., Anthony—V. Fowler (tin shop and radio factory)—tinners brake.

Kan., Anthony—E. Holmucker, c/o A. Miller (machine shop)—power lathe, drill press, emery wheel, stand, belting, hangers, pulleys, shafting, bearings, also blast furnace for blacksmith shop.

Kan., Anthony — Justice Battery Co. (exide battery repair shop)—power lathe.

Kan., Anthony—T. & H. Radio Co.— power metal lathe.

Kan., Anthony—J. E. Sneath, 201 South Blue St. (garage)— belting, shafting, drill press, lathe, burning in machine, hangers, pulleys, emery stand and bearings.

Kan., Garden Plain—Wulf Bros. Auto Co. —power drill press.

Kan., Goddard—Emerick Garage, G. F. Emerick, Purch. Agt.—power lathe and drill press.

Kan., Harper—H. Ammann—power metal lathe for garage.

Kan., Harper—E. Wheilschlagle — power metal lathe for garage.

Kan., Kingman — N. Hobson & Son (garage) — power automobile cylinder grinder.

Kan., Kingman—E. R. King—power drill press for garage.

Kan., Kingman—Kingman Motor Service, L. E. Kiser, Purch. Agt.—power drill press, lathe and motor equipment.

Kan., Kingman—A. D. Rayl Motor Co., R. Markle, Purch. Agt.—cylinder grinder.

Kan., Kingman — Stead Bros. (machine shop)—metal lathe, drill press, cylinder press, burning in machine, belting and hangers.

Kan., Murdock—Wolfe Motor Co.—belting and power metal lathe.

Me., Portland—Portland-Nash Co.—machinery for proposed garage and machine shop.

Mass., Wakefield—C. Locash, Stark Ave. (machine shop)—machine table saw with about 3 hp. single phase motor.

Mo., St. Louis—Pennsylvania R R., Syndicate Trust Bldg., C. R. Peddle, Purch. Agt.—two planers, boring mill, radial drill and tire trimming lathe for Columbus shops.

N. J., Newark—Eagle Tool & Machine Co., 37 Freeman St.—hydraulic press, about 500 ton pressure, for die forcing (used).

N. M., Albuquerque—Quickel Automobile & Supply Co.—garage, machine and repair shop equipment for $75,000 service station, to replace that which was destroyed by fire.

N. Y., Albany—F. La Du, State Engr., 158 State St.—two lathes, drill, planer, etc., for proposed machine shop; also complete dust cleaning system, including pneumatic cleaners, low pressure conveyors, capacity 20,000 bu. per hour, etc., for proposed $1,000,000 grain elevator at Oswego.

N. Y., Brooklyn — M. Kamenstein, 135 Pearl St. (tinware)—No. 295 or 300 Bliss automatic wire ring machine.

N. Y., Buffalo—V. Budziak, 793 Northampton St.—equipment for automobile service station, also two 1,000 gal. gasoline tanks and pumps.

N. Y., Buffalo—Hugh Co., Inc., 190 Elk St.—110 volt, 25 cycle, a.c. ⅞ in. drill.

N. Y., Buffalo—S. Landt, 494 Elmwood Ave.—machinery, tools and equipment for proposed $40,000 garage and service station.

N. Y., Corning — Elmira, Corning & Waverly R.R. Co.—repair shop machinery and equipment, including lathe, drill, grinder, welder, etc.

N. Y., Jamestown—Palmeter Tool Co., 308 Falconer St.—tool working machinery and equipment for factory at Celeron.

N. Y., Orwell—Orwell Garage & Machine Shop—bench miller and portable electric drill, 220 volt.

N. Y., Pulaski—Pulaski Motor Sales Co., Main St.—20 in. vertical drill press for garage and machine shop.

N. Y., Pulaski—A. E. Olmstead & Son Co. (machine shop)—2 x 2 in. power metal saw and one 1½ ton triple chain hoist.

N. Y., Sacket Harbor—Markham & Lepper Co., Broad St. (machine shop), H. Markham, Purch. Agt.—slotter.

N. Y., Watertown — G. Forrester Co., Court St. (brazing and welding)—oil operated annealing oven and power operated metal shear.

N. Y., Watertown—W. S. Stafford, 512 West Main St., W. D. Ogsbury, Flower Bldg., Purch. Agt.—machine tools for motor repair for proposed $10,000 garage.

O., Defiance—Kruder-Weirck Mfg. Co.— machinery and equipment, including presses, shears, etc., for the manufacture of metal containers.

O., Springfield—Peet & Schuster, Centre & Jefferson Sts., O. F. Mitchell, Pres.— metal working machinery, including shearing machine and slotter.

Okla., Oklahoma City—Amer. Electrical Co., 708 North Bway.—power metal lathe, 16 in. swing, 6 ft. base.

Pa., Franklin—Bd. Educ.—machine shop equipment, including lathe, drill, grinder, etc. (new).

Pa., Johnstown—Robinson Motor Car Co., 212-218 Main St.—machine shop equipment, including lathe, press, drill, etc.; small bench tools; air compressor and service station equipment.

Pa., Lancaster—Schmid Bros. (machine shop)—straight side punch press, arched punch press, also die bore, 4¼ in. bore, 6 in. hub.

Pa., Phila. — Associated Engineers Co., 1001 Diamond St.—punch press.

Pa., Scranton—A. Anderson, 409 Adams Ave.—lathe, press, drill, grinder, etc., for proposed $40,000 garage and service station.

Va., Richmond—E. M. Gourlay, 6-8 South Madison St.—drill press and cylinder grinder.

Va., Richmond—Gregory Bros., 611 West Main St. (plumbing and steam fitting)— drill press, gap shears and power punch for metal.

Va., Richmond—H. E. Lang, 10-12 South Madison St.—medium size lathe for automobile repair work.

Va., Richmond—Lloyd Motor Co., 315 West Main St.—cylinder grinder.

Va., Richmond—Premier Service Co., 310 West Broad St.—drill press, 1 ton portable hoist, air compressor and gas tank.

Va., Winchester—Shade Motor Co.— drill press.

Va., Winchester—Winchester Automotive Machine Wks.—drill press and milling machine.

Wis., Fond du Lac — H. W. Voell, 59 North Main St.—automobile repair machinery, gasoline tanks and pumps for proposed $40,000 garage.

Wis., Green Bay—Green Bay Motor Car Co., 316 North Jefferson St.—repair shop machinery and equipment, also air compressor for proposed $50,000 garage.

Wis., Milwaukee—Jensen Furnace Co., 525 3rd St. (sheet metal and furnace works), C. Jensen, Purch. Agt.—bending rolls, 8 to 10 ft. brake and beader.

Wis., Prairie du Sac—J. U. Schmidt— automobile repair machinery, drill press, small tools and gasoline storage tanks for proposed $40,000 garage and repair shop.

Wis., Racine—G. Nelson, 3009 Washington Ave.—automobile repair machinery and gasoline storage tanks for proposed garage.

Wis., Rice Lake—C. O. Ronning—automobile repair machinery, drill press, gasoline tanks and pumps for proposed 50 x 160 ft. garage.

Que., Acton—M. Lefebvre—equipment for automobile repair and blacksmith shop.

Que., Beauharnois—A. Langlois—automobile repair shop equipment.

Que., Bedford — E. J. Ferland, Lower Main St.—garage and automobile repair shop equipment.

Que., Montreal—Burnside Garage, Ltd., 29 Mount Royal St., W., F. S. Brown, Purch. Agt.—complete equipment for repair shop.

Que., Montreal—Duplessis, Benrier & Valquet, 27 Alexander St., A. Duplessis, Purch. Agt.—cylinder grinding and gear cutting machinery.

Que., Pont Chateau—L. Carriere—equipment for blacksmith shop and small machine repairs.

Que., St. Jude—L. Roy—garage and automobile repair shop equipment.

Que., Scotstown—Scotstown Garage Co., E. A. McIver, Purch. Agt.—garage equipment.

Que., Shawenegan Falls — Garage Lambert, 16 4th Ave., A. Lambert, Purch. Agt. —automobile repair shop equipment.

Que., Sherbrooke—East End Shop & Garage Co., Ltd., 43 Bowen St., E. Z. Blais, Purch. Agt.—equipment for automobile repair shop.

Que., Sherbrooke—J. A. Houde, 6 King St., E.—additional machine and blacksmith shop equipment.

Que., Sherbrooke — Sangster Fireproof Garage, 31 Wellington St., J. R. Sangster, Purch. Agt.—automobile repair shop and garage equipment.

Que., Vercheres—M. Desmarais—complete equipment for garage and automobile repair shop.

Machinery Wanted

Ala., Townly—Corona Coal Co.—electrical coal mining machinery and equipment.

Calif., Torrance—Western Sheet Glass Co., A. Sieroty, Pres.—machinery and equipment for the manufacture of wire glass.

Conn., Bridgeport—S. Lowndes, 40 Union Ave.—looms and equipment for new elastic fabric plant.

Fla., Miami—Drake Lumber Co.—machinery and equipment for several proposed sawmills near Kelsey City.

Ga., Columbus—J. Slaughter, Genl. Mgr. —saw and lumber mill machinery and equipment, including saws, planers, transmission and conveying machinery, etc.

Ill., Chicago—Fort Sheridan Printing Co., 1418 South Kolinan St.—12 x 18 in. or 10 x 15 in. Miller Gordon job press.

Ill., East Alton—Western Cartridge Co. —machinery and equipment for plant for the manufacture of cartridges, to replace that which was destroyed by explosion.

Ind., Bluffton—B. K. Settergren Co.— woodworking machinery and equipment for the manufacture of pianos.

Ind., Columbus—Evening Republican— duplex press for seven column newspaper.

Ind., Indianapolis—Mchy. Clearing House, 424 Bd. of Trade—lathes for turning wood.

Ind., Rushville—O. L. Carr, Perkins and 5th Sts. (lumber)—Tower edger and trimmer.

Ia., Clinton—Climax Eng. Co., foot of 4th St.—equipment for large addition to foundry.

Kan., Anthony — Anthony Planing Mill, E. A. Kennedy, Purch. Agt.—power wood lathe, metal lathe and mortiser.

Kan., Anthony — Republican Publishing Co., H. M. Sidney, Purch. Agt.—power job printing press and Miller feeder (used).

Kan., Barnard—G. F. Wilson—newspaper press and paper cutter (used preferred).

Kan., Cheney—Robinson Cabinet Shop, J. Robinson, Purch. Agt.—Universal woodworker and power belt sander (used).

Kan., Conway Springs — Conway Springs Star, R. H. Cline, Purch. Agt.—power paper cutter.

Kan., Conway Springs — J. Sedgwick (planing mill)—power belt sander (used preferred).

Kan., Fort Scott—L. Keplinger (building contractor)—mill working machinery, electric power.

Kan., Goddard—R. M. Oldfather—air compressor for oil station.

Kan., Harper — J. M. Frazee — power leather stitcher and finisher for shoe shop.

Kan., Harper—Harper Advocate, R. A. Reazin, Purch. Agt.—power metal saw and trimmer.

Kan., Harper—Living Message (job printer), T. Corey, Purch. Agt.—power newspaper folder and stereotype machine.

Kan., Kingman—Kingman Journal, R. S. Whitelow, Purch. Agt.—power metal cutter and trimmer.

Kan., Kingman—Leader-Courier, P. C. Palmer, Purch. Agt.—power job printing press.

Kan., Kingman—Wallace Garage, R. R. Wallace, Purch. Agt.—emery wheel with stand, burning in machine, belting, pulleys and hangers.

Kan., Ottawa—R. A. Harris—newspaper press, power paper cutter and linotype (used preferred).

Ky., Ashland—Ironton Stove & Mfg. Co. —foundry and enameling machinery and equipment.

Ky., Louisville—Office of United States Engineer, E. F. Kanzler, Purch. Agt.—2,000 ¾ in. round steel rods, 22 ft. 4 in. long; 7,800 washers and drift bolts, ¾ x 20 in. Estimated cost $5,000.

Ky., Sturgis—Bell Coal & Navigation Co. —loading and conveying machinery for coal mines.

La., Monroe—Brown Paper Mills, Inc.— machinery and equipment for $2,000,000 pulp and paper mill.

La., Roseland—Roseland Veneer & Mfg. Co.—sawmill machinery and equipment.

Md., Baltimore — Baltimore News & American, Fayette and Calvert Sts.—forty linotype machines, conveyor equipment, etc., for proposed $750,000 newspaper plant.

Md., Frostburg—C. J. Rowe—electrical coal mining, hoisting and screening machinery.

Mass., Boston—Boston Elevated Ry. Co., 108 Massachusetts Ave., E. Dana, Genl. Mgr.—receiving bids until July 20 for furnishing, delivering and erecting complete coal handling system in power house of shops at Everett.

Mass., Boston — W. H. Field Co., 39 Washington St.—woodworking machinery.

Mass., Boston—Magee Furnace Co., 38 Union St., address manager—foundry machinery and equipment, including furnaces, forges, blowing and ventilating equipment, for new plant at Taunton.

Mass., Boston—Merrimac Clay Products Co., 53 State St., H. Raeder, Mgr.—conveying, drying and miscellaneous equipment for new plant at Plaistow, N. H.

Mass., Cambridge — House of Byer, 26 Lansdowne St.—equipment for the manufacture of hosiery and knitted goods.

Mass., Dorchester (Boston P. O.)—Hallett & Davis Piano Co., 180 Hallett St., address manager—conveying machinery for new dry kiln, also woodworking machinery.

Mass., Gardner—Gardner Muslin Underwear Co., Parker St.—equipment for proposed $40,000 factory.

Mass., Lowell—Ingham Worsted Co., E. Hoyle, Mgr.—additional woolen mill machinery.

Mass., North Andover (Lawrence P. O.) —School Com.—machinery, including lathe, planer, saws, tables, benches and small tools for manual training department of new high school.

Mass., Wellesley (Boston P. O.)—N. B. Knease Brooks—machinery and equipment for yarn mill at Tunkhannock, Pa.

Mass., Worcester—Amer. Steel & Wire Co., Grove St.—machinery, including overhead crane, for proposed annealing plant.

Mass., Worcester—Worcester Spinning Co., Beacon St., E. Eisner, Mgr.—machinery for woolen mill.

Minn., International Falls — Backus-Brooks Co.—paper machines, presses, etc., for proposed paper mill at Kenora, Ont.

Miss., Strengthford (Waynesboro P. O.) —J. O'Keefe, Genl. Mgr.—lumber mill machinery and equipment.

Mo., Joplin—Rochschild Iron & Metal Co., 7th and Missouri Sts.—scales, 12 ton or larger.

Mo., St. Louis — Hannibal-Brown Shoe Co., 12th and Washington Sts.—equipment for proposed $150,000 factory.

N. J., Jersey City—Hudson County Knitting Mills, Wayne St., A. Siew, Purch. Agt. —machinery for mill.

N. J., Paterson—H. M. Bornstein, 21 Mill St.—50 tub silk looms.

N. Y., Binghamton—Truefield Shoe Co., Inc., Gaines and Front Sts.—shoe manufacturing machinery and equipment.

N. Y., Bowmansville — Bowmansville Creamery Co.—equipment for the manufacture of ice cream.

N. Y., Brownville—L. M. Kilborn (woodworking)—one light bandsaw with frame and table (new or used).

N. Y., Buffalo—Cuff Packing & Provision Co., 967 William St.—equipment for proposed sausage factory.

N. Y., Buffalo—Danahy Packing Co., 22 Metcalfe St.—equipment for proposed addition to meat packing plant.

N. Y., Buffalo—Home Family Laundry, 280 Guilford St.—equipment for proposed small addition to laundry.

N. Y., Buffalo—Huntington & Fink, Virgil Ave. along tracks of Erie R.R.—planing mill equipment, to replace that which was destroyed by fire.

N. Y., Buffalo—F. Jekel, 41 Granger Pl. —equipment for proposed small furniture factory at North Tonawanda.

N. Y., Buffalo—H. W. Wolcott, 1461 Main St.—equipment for charging and repairing electric storage batteries for proposed addition to plant.

N. Y., Carthage—Carthage Sulphite Pulp & Paper Co.—machinery and equipment for proposed $200,000 factory, to replace that which was recently destroyed by fire.

N. Y., Carthage—W. G. Hamilton Co., 259 State St. (manufacturer of novelties)— 2 in. capacity, power operated hack saw.

N. Y., Colonie (Watervliet P. O.)—Embossing Co.—machinery and equipment for 1 story addition to plant for the manufacture of mechanical toys.

N. Y., Dexter—Dexter Sulphite Pulp & Paper Co., C. Campbell, Purch. Agt.—one electrically operated bench jointer.

N. Y., Gouverneur — Dawley Bakery, Inc., G. Dawley, Purch. Agt.—power operated dough mixer.

N. Y., Jamestown—Jamestown Malleable Products Co., Tiffany Ave.—hoisting machines for proposed $50,000 foundry.

N. Y., Jamestown—C. A. Nelson, Route 75—one large stage and size air compressor with electric motor; pumps and machinery for gasoline distributing station.

N. Y., Jamestown — Premier Cabinet Corp., 61 Water St.—additional woodworking machinery and equipment.

N. Y., Massena—W. L. Pratt Lumber Co. (lumber and planing mill)—3 saw edger.

N. Y., New York—Railway Steel Spring Co., 30 Church St.—two 15 ton cranes, 80 ft. 6 in. span for Latrobe, Pa.

N. Y., North Tonawanda — F. Jaeckle, Fredericka St. — woodworking machinery and equipment, including transmission and conveying machinery, lathe, planers, stickers, molders, tenoner, saws, etc.

N. Y., North Tonawanda—Lenox Furniture Co., Miller St.—equipment for furniture factory.

N. Y., North Tonawanda — Van Raalte Silk Mills, Inc.—seventeen silk weaving looms.

N. Y., Oneida—Chapman Guild, Inc.— Banner hosiery machines, 108 needles, 3½ cylinders (used).

N. Y., Rochester—Addison Lithographing Co., Griffith St.—eight Hoe Stone presses and other lithographing machinery for proposed $85,500 plant.

N. Y., Rochester—Don-O-Lac Co., 770 Exchange St.—machinery and equipment for proposed $50,000 paint and varnish plant, to replace that which was destroyed by fire.

N. Y., Rochester—Rochester Industries, Inc., St. Paul St., M. H. Anderson, Mgr.— machinery and equipment for the manufacture of portable typewriters.

N. Y., Savannah—F. D. Wells—guy or stiff leg derrick, also 3 drum hoist with swinger to handle 1.5 yd. clam shell bucket.

N. Y., Schenectady—Bd. Educ.—vocational machinery, tools and equipment for new $200,000 school.

N. Y., Watertown—Northern Oil & Fuel Corp., Coffeen St., G. W. Lane, Purch. Agt. —two electrically operated gas pumps, air compressor and tank for proposed service station at Cape Vincent.

N. C., Elizabeth City—Standard Mfg. Co. —additional knitting mill machinery.

N. C., High Point—High Point Enterprise—24 to 32 page power newspaper press, also dry matrix stereotype equipment.

N. C., Marshville—Union Lumber Co.— lumber mill machinery, including transmission and conveying machinery, planers, saws, etc.

N. C., Reidsville—Cartex Underwear Co. (cotton mill), W. Pannill, Mgr.—machinery for new bleaching and dyeing plant.

N. C., Shelby—T. J. Babington—foundry equipment, including molds, hoists, etc.

O., Barberton—Vutex Rubber Co.—rubber working and tire building machinery.

O., Columbus — Gas Products Co., 100 North Skidmore St., S. D. Winger, Genl. Mgr.—one oxygen compressor.

O., Columbus—E. J. and W. E. Jones, 420 West Spring St. (millworking)—two moulding machines.

O., Columbus—Porter Co., 829 South Ohio Ave. (manufacturer of moth bags), D. Bull, Purch. Agt.—one special pressing machine for bags, also one eyelet machine.

Okla., Atoka—Atoka Press—10 x 15 in. power job press and paper cutter.

Pa., Apollo—Bd. Educ.—vocational equipment for $100,000 school.

Pa., Centralia—Lewis Bros. Shirt Co.— cutting, transmission and conveying machinery, etc., for proposed $50,000 factory.

Pa., Erie—Fox Textile Co., 510 East 10th St.—textile machinery for new shop.

Pa., Middletown—Wincroft Stove Wks.— hoists, trip hammers and foundry equipment for new stove works at Florin.

Pa., Rankin (Braddock P. O.)—Acheson Mfg. Co., F. C. Robertshaw, Genl. Mgr.— rolling mill and wire drawing equipment.

Pa., Susquehanna—Susquehanna Tri Bore Throwing Co.—$40,000 worth of silk mill and throwing plant machinery and equipment.

S. C., Newberry—Oakland Cotton Co.— additional cotton mill machinery.

Tenn., Chattanooga—Milne Chair Co.— No. 214 Mattison cabriole lathe.

Tex., Corsicana—Humble Oil Co.—electrically operated pumping machinery and equipment.

Tex., Luling—United North & South Oil Co.—machinery and equipment, including transmission and conveying machinery, for proposed $100,000 refinery.

Tex., McAllen—S. W. McClure—complete newspaper equipment.

Tex., Megargel—Business Men's Club— cotton gin.

Va., City Point—Wilson Hock Co. (machinery dealers)—high speed planer and band resaw.

Va., Marion—Amalgamated Mining & Development Co., A. T. Short, Pres.—electric mining machinery and equipment, including cutting, grinding, screening and transconveying machinery.

Va., Richmond—Acme Printing Co., 19 East Main St.—10 x 15 in. job press, Chandler & Price preferred.

Va., Richmond—H. I. Bernard, 703 West Main St. (automobile repairs)—welding outfit.

Va., Richmond—Trade Engraving & Printing Co., P. O. Box 1354—power stitcher and medium size job press.

Va., Roanoke — Cement Products Mfg. Co.—complete machinery and equipment for the manufacture of tile products at Wasena.

W. Va., Bluefield—Premier Red Ash Coal Co.—electrical coal tipple machinery and equipment.

W. Va., Clarksburg — The Exponent (newspaper)—Washington press.

Wis., Appleton—E. A. Kottke, 450 Walnut St. (structural steel fabricator)—5 ton electric crane.

Wis., Colby — Clark-Marathon .County Cheese Co., c/o A. Brehm—refrigeration machinery.

Wis., Eau Claire—Dells Pulp & Paper Co., Dell's Dam—pulp grinders for proposed $500,000 addition to mill.

Wis., Hortonville — J. W. Haughton — newspaper press and power paper cutter.

Wis., Madison—Newell Bros. Co., 2306 University Ave. (general contractor), A. Newell, Mgr.—36 in. sander with 3 drums, motor driven; 12 in. turning lathe (new or used).

Wis., Manitowoc — Manitowoc Products Co., c/o O. H. Senglaub—churns, ice cream making and refrigeration machinery, etc., for proposed $50,000 dairy.

Wis., Milwaukee—Buckley Wet Wash Laundry, 531 31st St.—power washer, mangles, dryers, belting, shafting and hangers.

Wis., Milwaukee—J. Eckert, 701 56th St. (carpentry and millwork)—30 to 32 in. bandsaw (used preferred).

Wis., Milwaukee—M. R. Hunter, 16th St. and Viaduct—gas driven belt conveyor, 25 to 30 ft. long.

Wis., Milwaukee—H. R. Mayer, 1279 36th St. (carpentry and millwork)—one 3 in. sticker, motor driven.

Wis., Milwaukee—Patek Bros., 232 East Water St. (manufacturer of paint), G. Patek, Purch. Agt.—monorail crane.

Wis., Milwaukee—Sinclair Refining Co., 425 East Water St.—15,000 gal. oil storage tank and pumps for proposed $40,000 service and filling station.

Wis., Neenah—H. and W. Niles, c/o Neenah Boat Wks.—wood and metal working machinery, etc., for proposed $50,000 addition to boat factory.

Wis., Racine—Lockwood Oil Co., 1,421 Racine St.—oil storage tanks and pumps for proposed $40,000 filling station.

Wis., Weyauwega — School Bd.; F. H. Russell, Pres.—manual training machinery and equipment for proposed $150,000 high and grade school.

N. S., Middleton—A. W. Allen & Sons—sawmill and woodworking machinery and equipment, including lathe, planer, sticker, etc.

Ont., Bolton—Walshaw & Son Woolen Mills—machinery and equipment for plant, to replace that which was destroyed by fire.

Ont., Fort William—Great Lakes Pulp & Paper Co., Ltd.—machinery for the manufacture of pulp and paper for plant on Kaministiquia River.

Ont., Gorrie—R. Hueston—equipment for flour mills, to replace that which was destroyed by fire.

Ont., Guelph — Guelph Stove Wks. — foundry equipment for addition to works.

Ont., Iroquois—H. H. Caldwell—equipment for proposed $40,000 linen mill.

Ont., Merritton—Garden City Paper Co., L. H. Gardiner, Pres.—paper making machines, rolls, etc., for proposed $400,000 paper mill.

Ont., Ottawa—Dept. of Marine, Hunter Bldg.—equipment for proposed $200,000 grain elevator at Halifax, N. S.

Ont., Paisley — Carlaw & Lindsey — equipment for flour mills, to replace that which was destroyed by fire.

Ont., Sarnia—Imperial Oil Co., C. Stillman, Mgr.—oil tanks and pumping equipment, to replace that which was destroyed by fire and explosion. Estimated loss $60,000.

Ont., Tamworth—A. B. Carscallen & Co. (feed mill and electric light plant)—one "Atrician" grinder, shafts, etc.

Que., Hull—Mica Co. of Canada, Ltd., Lois St., E. G. Rykert, Purch. Agt.—special machinery and equipment for the manufacture of mica insulating units for plant at Massena, N. Y.

Que., Iberville Junction—Brodies, Ltd. (granite works)—quarrying and other equipment.

Que., Montreal—City Advertising Service Regd., Albee Bldg., Mayor St., H. Birtnell, Mgr.—15 x 18 in. printing press, Chandler & Price preferred; paper cutter, type, cases and other printing equipment.

Que., Montreal — French's Complet Ore Reduction Co. of Canada, c/o E. Leboeuf, 28 St. Clement St.—mining, quarrying, dredging and refining machinery.

Que., Montreal—Natl. Rubber Co., Ltd., 207 St. Catherine St., W.—cloth cutting machine, also Eastman or Bollard long knife cutting machine.

Que., Outremont—Eastern Canada Collieries, Ltd., c/o F. G. Bush, 856 Maplewood Ave.—complete equipment.

Que., St. Nazaire—E. Giguere—equipment for blacksmith shop.

Que., St. Ours—P. Allaire—additional equipment for sawmill, including dragsaw.

Que., Thetford Mines—B. Charest, Notre Dame St.—automobile tire and vulcanizing equipment.

Que., Westmount—Duntile Co., Ltd., c/o H. E. Walker, 59 Trafalgar Ave.—equipment for the manufacture of tiles, bricks, drain and sewer pipes, etc.

Metal Working Shops

Calif., Los Angeles — I. Beveridge, c/o Milwaukee Bldg. Co., Wright & Callendar Bldg., awarded the contract for the construction of a 1 and 2 story garage on Sunset Blvd. near Wilcox Ave. Cost will exceed $40,000.

Calif., Los Angeles—The Southern Pacific Co., Southern Pacific Bldg., is having plans prepared for the construction of a 1 story, 34 x 498 ft. locomotive erecting shop and twenty four engine pits, served by a 250 ton and two 15 ton traveling cranes. Estimated cost $600,000, including equipment. Private plans.

Calif., Oakland—The J. W. Murray Mfg. Co., 5-140 Genl. Motors Bldg., Detroit, Mich., plans to build a factory for the manufacture of automobile parts, here. Estimated cost $250,000.

Calif., Sacramento—The Ochsner Estate, Ochsner Bldg., is having plans prepared for the construction of a 1 story, 40 x 160 ft. garage on K and 14th Sts. Estimated cost $40,000. E. C. Hemmings, Ochsner Bldg., Archt. Reo Motor Car Co., 1309 K St., Sacramento, lessee.

Calif., San Francisco—J. D. Phelan, c/o A. G. Scholz, Archt., Phelan Bldg., is having plans prepared for the construction of a 1 story, 222 x 312 ft. garage on 17th and Valencia Sts. Estimated cost $200,000.

Calif., San Francisco—The Williams Bros. Aircraft Corp., 1211 Van Ness Ave., is receiving bids for the construction of a 1 and 2 story factory on 25th St. between Potrero Ave. and Utah St. Estimated cost $40,000. R. R. Irvine, 736 Call Bldg., San Francisco, Archt. Noted July 12.

Conn., East Hartford—The P. B. Herith Mfg. Co., 22 Union St., Hartford, manufacturer of machinery and tools, plans to build a 2 story, 50 x 70 ft. factory on Folland St., here. Estimated cost $50,000. Engineer or architect not selected.

Conn., Hartford—S. S. Nelson, 20 Magnolia St., is having plans prepared for the construction of a 1 story garage, etc., on Church St. Estimated cost $65,000. F. C. Walz, Trumbull St., Hartford, Archt.

Conn., Hartford—The Parker Shirt Co., Walnut St., New Britain, awarded the contract for the construction of a 2 story, 40 x 80 ft. garage and storage building on Walnut St., here. Estimated cost $40,000.

D. C., Wash.—M. M. Crawford, 230 Bates St. N. W., awarded the contract for the construction of a garage. Estimated cost $50,000.

Ill., Chicago — M. Binz, c/o Harders Fireproof Storage & Van Co., Calumet and 40th Sts., is receiving bids for the construction of a 1 story, 130 x 175 ft. garage. Estimated cost $40,000. L. E. Russell, 25 North Dearborn St., Archt.

Ill., Chicago — The Rienzi Garage, 554 Diversey Parkway, representing owner, awarded the contract for the construction of a 2 story, 150 x 250 ft. garage on Lehman St. near Dale St. Estimated cost $250,000.

Ill., Chicago—P. C. Winn, c/o J. Burns, Archt., 64 West Randolph St., is receiving bids for the construction of a 2 story addition to garage on Sheridan and Morse Sts. Estimated cost $150,000.

Ill., Harvey — The S. W. Hamilton Co., 152nd St., manufacturer of hardware specialties, is receiving bids for the construction of a 1 story, 90 x 170 ft. addition to its factory. Estimated cost $60,000. H. Raeder, 20 West Jackson St., Chicago, Archt.

Ind., Laporte—The Bastian Morley Co. plans to build a 2 story addition to its plant for the manufacture of boilers. Estimated cost $42,500.

Mass., Fall River—The Center Garage Co., 101 2nd St., awarded the contract for the construction of a 2 story, 100 x 200 ft. garage on 4th and 5th Sts. Estimated cost $100,000.

Mo., Carthage — The Liggett & Platt Spring Bed & Mfg. Co. plans to build a 2 story factory for the manufacture of spring beds. Estimated cost $50,000. Engineer or architect not announced.

Mo., St. Louis—The Police Dept. is having plans prepared for the construction of a 2 story garage, armorer's department, repair and carpenter shop on Laclede St. Estimated cost $75,000. Private plans.

N. Y., Brooklyn—J. Cervansky, c/o T. Goldstone, Engr. and Archt., 50 Graham Ave., will build a 1 story garage on Stockholm St. Estimated cost $55,000.

N. Y., Brooklyn—C. Katz, c/o T. Goldstone, Engr. and Archt., 50 Graham Ave., will build a 1 story, 120 x 200 ft. garage on Grand St. Estimated cost $50,000.

N. Y., Jamestown—The Jamestown Malleable Products Co., Tiffany Ave., awarded the contract for the construction of a 1 story, 50 x 200 ft. foundry. Estimated cost $50,000.

N. Y., New York — The Wilfred Realty Corp., c/o C. Kreymborg, Engr. and Archt., 2534 Marion Ave., will build a 1 story, 100 x 140 ft. garage on Kingsbridge Rd. Estimated cost $60,000.

N. Y., Syracuse—S. K. Bresee awarded the contract for the construction of a garage, machine and repair shop at 406 West Willow St. Estimated cost $25,000.

N. Y., Watertown—W. S. Stafford, c/o W. D. Ogsbury, Agt., Flower Bldg., plans to build a machine shop, repair and service station at 512 West Main St. Estimated cost $10,000.

Pa., Millvale (Pittsburgh P. O.)—A. Gerzowski, Searcy Rd., awarded the contract for the construction of a 2 story, 41 x 100 ft. garage on Grant Ave. Estimated cost $40,000.

Ont., Toronto—The Mahaffy Iron Wks., 4 Trafalgar Ave., plans to build a factory on Kendall Ave. Estimated cost $50,000.

Watch The Latest Opportunities

Turn To Pages 209-231

In The Searchlight Section Of This Paper